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in the City of New York

A MEDICAL CENTER FOR NEW YORK

THE ALLIANCE BETWEEN COLUMBIA UNIVERSITY AND PRESBYTERIAN HOSPITAL

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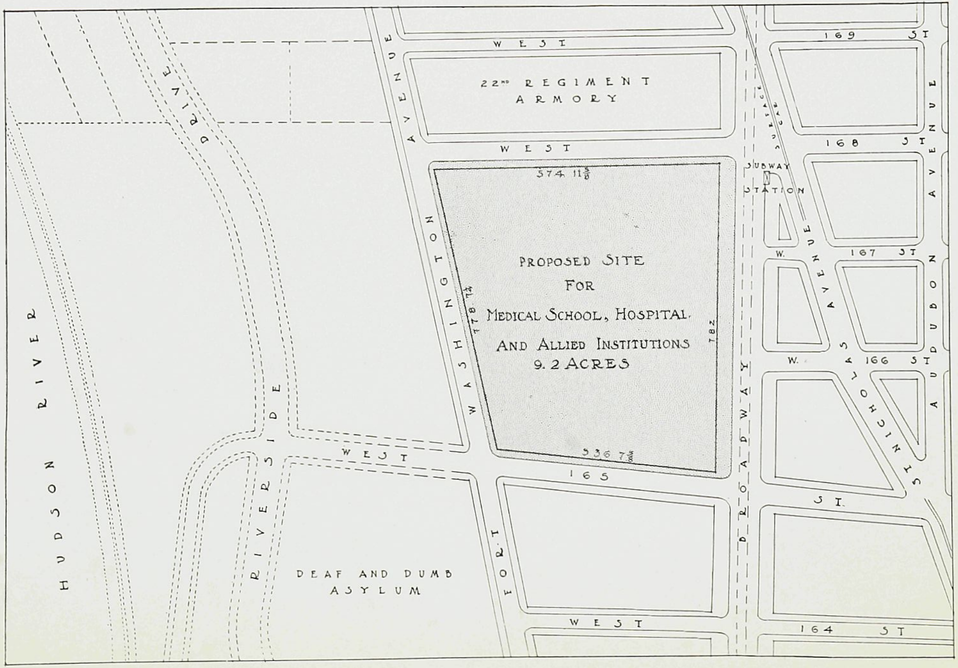


PROPOSED SITE FOR MEDICAL SCHOOL, HOSPITAL AND ALLIED INSTITUTIONS

Columbia University in the City of New York

A MEDICAL CENTER FOR NEW YORK

THE ALLIANCE BETWEEN COLUMBIA UNIVERSITY AND PRESBYTERIAN HOSPITAL

The present great centers of medical teaching and research in the world are Paris, Vienna and Berlin. In this country important beginnings in modern organization and method have been made in only a few places, and American medical schools have developed their methods and systems of education for the most part without a proper association between the hospitals and the schools. This is preeminently true of New York, and in spite of the excellence of the College of Physicians and Surgeons and other medical schools and the several excellent hospitals, this metropolitan city has lagged behind in medical teaching and research, directly because that intimate coöperation and interdependence of medical school and hospital, on which this excellence depends, has been lacking.

In 1911, an intercorporate alliance was entered into between Columbia University and the Presbyterian Hospital which had in view a union of the two institutions through which the medical, surgical and pathological resources of the Hospital should be placed at the immediate disposition of the Medical School of the University and under its scientific and clinical direction, leaving, however, the control and management of the Hospital with its own Board of Managers as heretofore.

The Medical School of Columbia University was established as the College of Physicians and Surgeons in 1807. It is consequently one of the oldest schools of medicine, as it is one of the best known in the United States. It has behind it the tradition of more than a century of honorable scientific and philanthropic service, and its degree has been everywhere recognized as evidence of a professional education thoroughly adequate for the purposes of medical practice. The Presbyterian Hospital was founded forty-seven years ago for the reception of patients irrespective of creed, nationality or color. Throughout its existence it has advanced with the progress of medicine; it has remained faithful to the objects of its foundation, and it has gained for itself an enviable reputation as a progressive and well-managed institution that has played a leading part in the hospital service of the city.

The benefits of the alliance between the two institutions are in every sense mutual and cannot well be overstated in their extent and value. The Medical School, by this union, was placed for the first time in possession of clinical facilities, which it had lacked, commensurate with its own laboratory and teaching equipment and favorable to their proper expansion; and the experience of five years has demonstrated that the alliance is of inestimable value to the Hospital in promoting efficient care of the sick.

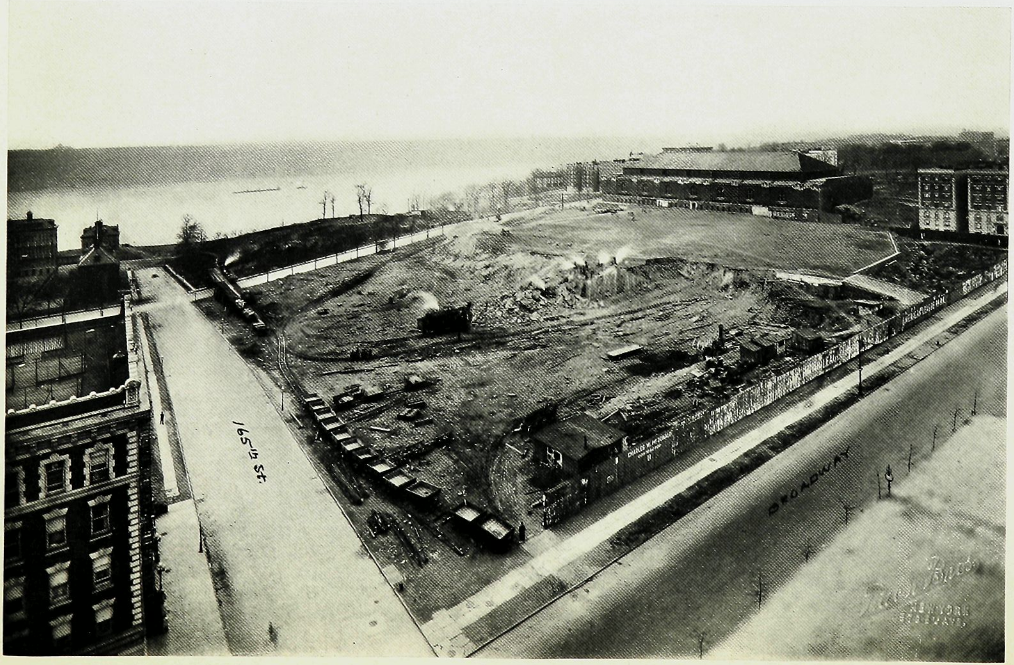
A hospital like the Presbyterian must actively and intelligently keep pace with the development of the science of medicine in whatever form or from whatever direction it may appear; it must always be ready and willing to discard old and accepted conditions so soon as new and more approved methods have been devised to substitute for them or to improve them; and in equipment and service it must maintain a routine in which no effort is spared in the attempt to give the patient the benefit of every possible bit of evidence that may throw light on his illness and suggest plans for his cure. All this requires the ceaseless work of many men. Chemical and physiological studies with the use of instruments undreamed of a few years ago, bacteriological studies unimaginable even in the early days of this Hospital, all need the services of men who have been especially trained in these directions. Through the alliance with Columbia and its College of Physicians and Surgeons the best expert knowledge that can be gathered by the University from the whole country is pledged to the service of the Hospital. A medical school, in its turn, to secure proper educational efficiency must have in its teaching hospitals adequate opportunity for that direct study of the patient which is the all-important factor in the training of the intending physician. The alliance gives the Medical School, in abundant measure, and far beyond anything that is at present at hand in this city, the opportunity to bring the student into close and active relation with the patient, to his own advantage and to the advantage of the student as a future practitioner.

Prior to the death of its late President, Mr. John S. Kennedy, the Presbyterian Hospital had purchased property on the East River upon which to erect a new modern hospital, but later, upon entering into the alliance with Columbia University, it was found impossible for the College of Physicians and Surgeons to build adjacent to the hospital site selected and thus to bring about that proximity of the two institutions which is deemed by both to be essential to the attainment of the ideals contemplated in the alliance. For the execution of the plan there must be available sufficient land upon which to develop in the future, and to make provision for those numerous allied institutions and special hospitals that are now everywhere springing up as necessary parts of a well-rounded equipment for the scientific study of medicine.

Site

An option has now been secured upon a commanding site at Washington Heights, approximately ten acres in extent, between Broadway and Fort Washington Avenue, 165th to 168th Streets, overlooking the Hudson River and the Palisades. The plot is situated on ground 185 feet above the river and is accessible to approach by the Broadway and St. Nicholas Avenue surface line with its crosstown connections through 145th and 181st Streets. A close connection with all parts of Greater New York is secured by a station of the Broadway subway directly in front of the northeast corner of the plot. This site measures 574 feet on the north, 778 feet on the west, 536 feet on the south, and 782 feet on the east. It offers an ideal situation for the proposed buildings: it is on high ground, it is well supplied with air and light, it is accessible to patients and to students, it is free from objectionable surroundings, and it will be adequate for the purposes intended.

The building of this proposed medical center will also add to the hospital facilities of the city a new hospital, which is much needed in this vicinity. The Upper West Side of the city has not been supplied either with the hospital beds or with the ambu-



VIEW OF PROPOSED SITE, MAY, 1915

lance service requisite to care for that section in an efficient manner. The removal of the Presbyterian Hospital from its present location to the new site, accordingly, will secure to the city a much more effective distribution of hospital service.

The report of the State Charities Aid Association, issued in 1905, called attention to the lack of hospital beds on the west side of Manhattan as existing in 1905 and as probable for the year 1920. The greatest demand was in the Fort Washington district where the lack of hospital beds was stated to be 254 in the year 1905, and the probable deficiency was placed at 781 for 1920. The building of the new Presbyterian Hospital at the site selected will, therefore, fulfill the greatest need for hospital construction now existing in New York City. The same report emphasises the advantages of building the new Bellevue Hospital with a capacity of 1,500 beds. It also advocates the construction of a second large hospital before the ideal plan of hospital organization for New York can be considered complete. There is no better site on Manhattan Island than the plot selected for such a hospital. It will give the Hospital more than twice the amount of land which it now occupies for its new buildings and for future extensions; and, while the hospital will be in a different locality, this very fact will extend its usefulness, which in no wise will be curtailed, since at the present time experience has proved that in its out-patient department over fifty per cent. are patients coming from the city at large and not from the immediate district of the hospital itself.

The site proposed is large enough not only for the Presbyterian Hospital and the Medical School of to-day, but for all probable expansion, as well as for such allied hospitals and institutes as are either now in existence or are likely to be established. Notwithstanding the recent extraordinary advances in medicine and surgery, it appears to be the fact that we are as yet only at the beginning of what is possible, particularly on the side of preventive medicine, sanitary science and public hygiene. A great medical school, a great general hospital, and a group of special hospitals and clinics would constitute an assemblage of allied undertakings that would be without its equal anywhere as a center of medical teaching, of medical research, and of medical influence.

Buildings

A preliminary plan has been prepared for the development of the site in which the several units have been carefully considered in their relation to the completed whole. The plan calls for the immediate erection of several buildings. These include a building for administration; a building or buildings of much greater capacity than the present group on 59th Street to house the medical sciences, the Crocker Cancer Research laboratories, and a School of Sanitary Science and Public Health; a building or buildings to house the Hospital, with an ultimate capacity for at least 1,200 patients; a building for the Vanderbilt Clinic, to serve also as the out-patient department of the Hospital; dormitories for the accommodation of at least 400 medical students, with an adequate dining-hall for both students and instructors; and a building to house a training school for nurses and to serve as the nurses' home. The plan also provides space for a possible building for the Sloane Hospital. A considerable portion of the total area is to be left for the present unoccupied for the addition of future institutes or foundations which may become necessary as the result of the development of medical science, or which may affiliate themselves with the Hospital and the University.

The Medical School

The buildings of the new college of Physicians and Surgeons must contain all the departments which are now housed in the present building and in addition sufficient room for the permanent location of the George Crocker Cancer Research Foundation. In the present school in 59th Street, only one department can be said to have a sufficient accommodation and even that is over-crowded, because of the very poor lighting and bad arrangement of the rooms assigned to it. The present school contains 116,000 square feet, or 2,059,000 cubic feet; the new school should be at least half as large again to provide for the present necessities which are lacking today in all laboratory departments, and a further 16,000 square feet, or 200,000 cubic feet to provide for the new department of cancer research. If we are to include a department for preventive medicine and public health a still further increase of about 16,000 square feet, or 200,000 cubic feet would be necessary. It probably would not be too great a building for school purposes alone, to erect at the present time a building of 3,500,000 cubic feet for all the purposes indicated.

It may ultimately be found desirable to supply the necessary floor space by a sub-division into several buildings and to develop the school as made of separate institutes. At present a central building with executive offices and general lecture rooms and two laboratory buildings should suffice. One of these should be devoted to anatomy, physiology, chemistry and pharmacology, and the second to pathology, cancer research and the new department of sanitary science and public health.

Vanderbilt Clinic

The Vanderbilt Clinic, which is part of the University's equipment, and is now an independent dispensary at 60th Street and Amsterdam Avenue, should be rebuilt as a part of the new hospital or in close proximity to it in order that it may become the out-patient department of the new Presbyterian Hospital. The clinic building at 60th Street contains 52,140 square feet, or 543,970 cubic feet, and is at present badly cramped for space in every department. The recent addition of departments of visiting nursing and social service, the rapid development of the department for tuberculosis within the department of medicine, the needed addition of a department of dentistry and the demands of every existing department, would require a building increased by at least fifty per cent. on the present size. A building of 80,000 square feet floor area, or 900,000 cubic feet, therefore, would be none too large for the out-patient department, which would be required for the care of the numbers of patients who would be attracted to it and for the teaching which it is necessary to do in such a dispensary in connection with the hospital and school. A recent experience of a sister university which has been overwhelmed by the size of the dispensary classes attracted to its new plant, both hospital and dispensary, shows the folly of underestimating the value of a teaching plant as an attraction to patients and in consequence of erecting too small a building for dispensary use.

Sloane Hospital for Women

The Sloane Hospital has been developed to so high a grade of efficiency as to render it desirable to leave it in its present situation under conditions which will be acceptable to the managers of that institution. Land should be set aside and held vacant, however, for the future use of the Sloane Hospital in case it should ever be desired to move it to the new site.

Dormitories

A students' dormitory, to be equipped with meeting rooms and library, with accommodations for at least 400 students, should be added to the buildings on the new site. Such a dormitory is needed by every medical school in the country and is possessed by none. A dining hall or commons should also be included, and would undoubtedly be found a popular addition, not only by students but by instructors as well.

The Hospital

The plans under consideration by the management of the Presbyterian Hospital provide for a building designed to contain 650 beds. It will include the regular services for internal medicine and general surgery which form the basis of every general hospital. In addition, there will be eight separate ward services for special genito-urinary surgery, for orthopedic surgery, for diseases of the eye, ear, and nose and throat, for diseases of children, for diseases of the nervous system and for diseases of the skin, and a ward service for every department represented in the Vanderbilt Clinic, as well as 75 private rooms. The present buildings of the Presbyterian Hospital provide three services, those for medicine, surgery and diseases of children. The plans for the new hospital further provide a prearranged scheme for largely increasing the plant, if future needs should require it.

Endowment

The College of Physicians and Surgeons is at present maintained at an estimated deficiency of about $150,000 a year. A carefully prepared study of the needs for a new and urgently demanded department of sanitation and public health shows that for the purpose an addition is needed to the funds of the University to meet an additional annual expenditure of $40,000. The College of Physicians and Surgeons has not been able during the last four years to increase its usefulness along many needed lines because of this lack of available revenue. Gifts have been made annually by the friends of several departments to extend the work of these departments, but in order to assure the income received from such gifts, which are renewed annually only through the personal efforts of the teaching staff, and to provide still further for those additions to the work of the school which are urgent at the present time, at least another $20,000 annually is required.

In addition, the Hospital will need sums sufficient to enable it to carry on the entire plant to its full capacity. The cost of hospital support is underestimated in every hospital in the city. None of these institutions has increased the amount originally fixed for the endowment of a bed to a sum at all commensurate with the amount now required. The building of a 650 bed hospital involves a construction cost of $3,250,000. If 575 beds are ward beds, an endowment of $9,200,000 is necessary to capitalize the running expenses of the whole. The Presbyterian Hospital has an accumulated property value of about $7,000,000. If this be applied to the development of the new site, $1,000,000 must go for land, $3,000,000 for construction of the 650 bed hospital, and $3,000,000 will remain for endowment.

Financial Summary

To provide for the new buildings and the site, and to carry into effect the realization of the plans for the proper equipment of the Medical School under the conditions indicated—to enable it, in short, to perform its full part in the alliance between the University and the Hospital in the proper and progressive development of medical education in the city and in the nation—the University must raise a total fund of no less than $7,500,000, in accordance with the following schedule:

Estimated cost of new building for School of Medicine, including space for sanitary science and cancer research, 3,500,000 cubic feet at 50 cents	$1,750,000	
Estimated cost of rebuilding Vanderbilt Clinic, 900,000 cubic feet at 50 cents	450,000	
[Sloane Hospital is not included in the estimate]		
New equipment, estimated	100,000	
	$2,300,000	
Estimated value of half of 59th Street site; half being reserved for use of Sloane Hospital	300,000	
Net cost of new Medical School buildings and equipment		$2,000,000
Estimated cost of new site		1,000,000
Estimated cost of students' dormitory, including dining hall		400,000
Endowment for sanitary science and public health	1,000,000	
For general endowment	3,100,000	4,100,000
Total to be raised by Columbia University		$7,500,000

This is in addition to the sums needed by the Presbyterian Hospital to carry out fully its part of the proposed plan.

The alliance between Columbia University and the Presbyterian Hospital has opened a way to overcome the long standing deficiency that has existed in both medical teaching and research. Since 1911, the problem has been studied in all its aspects and the University and the Hospital now join in submitting to the men and women of New York and of the nation a project for the development in New York of one of the world's greatest centers of medical teaching and research. The plan involves the establishment of a new, thoroughly modern and complete general hospital surrounded by a group of other special hospitals and clinics, as is the case in European cities, and also the rebuilding and equipment on the more highly approved plans, and with adequate endowment, of the College of Physicians and Surgeons which has for four generations trained so large a proportion of the leading physicians and surgeons of the United States. Both University and Hospital have turned aside from their own individual projects of enlargement and improvement, in order to unite in this new joint undertaking which may be made of such inestimable value to medical science.

Letter to President Butler from President Pritchett of the Carnegie Foundation for the Advancement of Teaching.

New York, April 15, 1915

Dear President Butler:

I wish to thank you for an opportunity to read the confidential statement of the Committee of Trustees of Columbia University concerning the proposed plan for developing a centre of medical teaching, under university control, in connection with the Presbyterian Hospital.

My interest in the matter arises out of the studies which have been made by the Carnegie Foundation for the past five years in medical education. The project appears to me of such significance for the city and state of New York and for medical progress in the whole country that I desire to emphasize in every way possible its importance. In my judgment, there is no other field of university effort to which Columbia University can give itself which will so profoundly affect the interests of education, of science, and of the public health.

The reason for this can be told in a few words. Medical education and medical science in the United States have suffered serious harm in every way by reason of the fact that medical school, hospital (which is the laboratory of the clinician), and the university have not been rightly related. To bring out the best result, medical school and hospital must be hand in hand and both must be inspired with university ideals. It is just this object that is aimed at by acquiring now a sufficient tract of land and associating medical school and hospital under university auspices. To do this in New York will not only create a medical institution of the highest rank, but will improve more directly than can be done in any other way the medical conditions throughout the country. I regard the plan as one of the greatest to which a metropolitan university could address itself. There is no other service upon which Columbia could enter which would go further to make of New York a centre of scientific and humanitarian enlightenment.

Yours most sincerely,

(Signed) Henry S. Pritchett

Letter to President Butler from Dr. William Henry Welch, Baxley Professor of Pathology, Johns Hopkins University.

Johns Hopkins University, Baltimore

April 23, 1915

My dear President Butler:

The large and far-sighted plan for medical teaching and research outlined in your letter and in the confidential report of the special committee presents the most inspiring possibilities for advancement of medical knowledge and practice, for increase in the usefulness and renown of Columbia University and of the Presbyterian Hospital and for service in promotion of the public welfare.

Medicine can make to-day the strongest possible appeal for large financial support by virtue of its vastly increased and ever increasing power to preserve health and to control disease. Its scientific and humanitarian aims and accomplishments render its cultivation one of the worthiest functions of a modern university, and the hospital which shares in this educational work thereby serves the community most efficiently. The roots of research lie in the educational system, and both should be cultivated together. The contribution of medical science to the solution of great social and industrial problems of modern life is now widely recognized and is destined to be of the highest significance to the people.

Notwithstanding its good medical schools and hospitals New York does not hold to-day the leadership in medical education to which it is entitled by its position, its size and its importance. The creation of a great center of medical teaching and research as a part of Columbia University in coöperation with the Presbyterian Hospital would secure for these institutions foremost rank in medical education, and would bring inestimable benefits to the city, the university and the hospital, and indeed to the whole country.

It would be a source of great rejoicing not only to the friends of Columbia University and of the Presbyterian Hospital, but to all interested in higher medical education and the advancement of medical science and art to witness the fulfilment of this well-considered, broad plan, looking, as it does, with far-sighted vision beyond the needs of the moment to a future of assured growth and development full of the richest promise of high usefulness.

Believe me to be
Very sincerely yours,
(Signed) WILLIAM H. WELCH

#3

HOSPITALS and ESTHETICS

The Architectural Problem, with Particular Reference to Esthetics and the Art of Architecture

GROSVENOR ATTERBURY
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NEW YORK

Reprinted from The Journal of the American Medical Association
Sept. 25, 1915, Vol. LXV, pp. 1080-1085

American Medical Association
Five Hundred and Thirty-Five North Dearborn Street
CHICAGO

HOSPITALS AND ESTHETICS *

E ARCHITECTURAL PROBLEM, WITH PARTICULAR REFERENCE TO ESTHETICS AND THE ART OF ARCHITECTURE

GROSVENOR ATTERBURY
Fellow of the American Institute of Architects
NEW YORK

"In treating the patient, do not forget the man."

I. INTRODUCTORY

What we might call the mortal life of an architectural design ends with its crystallization into the three dimensions of the finished structure. With its resurrection in brick, stone and steel comes the final severance of the created thing from the constructive imagination of its designer. In happy instances it may also mark the beginning of an honored immortality. But in any event the investigation and study of a completed building is from the point of view of the architect really an academic question—a kind of pathologic study—and in the case of a hospital, at any rate, an affair most appropriately conducted by medical experts. And the matter may be left to them in this instance the more fittingly because the details of this building, as the result of conditions peculiar to the medical problem of the Phipps Clinic, are necessarily of limited interest except so far as they illustrate general principles either of institutional organization or architectural design. Therefore I shall confine my attention to a single general phase of this architectural problem—a phase preeminently important in the Phipps Clinic, but also of great, though I believe insufficiently recognized, value in all hospitals; affecting as it does that human side of every hospital problem so well epitomized in the sentence suggested for the entrance of the Virchow hospital in Berlin, and which I have taken for my text: "In treating the patient do not forget the man."

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* A paper prepared after the completion of the Henry Phipps Psychiatric Clinic at Johns Hopkins Hospital.

II. THE HOSPITAL AND ESTHETICS

So in the present discussion we shall not furthe concern ourselves over the dry bones of the matter—the anatom of the building and its pain growth out of the vast mass of sp cial requirements and conditions that carry the germ of the architectural solution of the problem.

On the other hand, I am vastly interested in the fact that we have managed to turn the iron window guards into little window greenhouses and that we have achieved open fireplaces and window curtains in the wards; and have even smuggled in quite charming brass andirons and fenders. For while these also are quite obviously details, they appeal to me not only because they are pleasant phenomena in themselves—like crocuses and bobolinks in spring—but because likewise they are signs pregnant with meaning. In this instance, moreover, they serve especially well to introduce the real subject of this paper, "Hospitals and Esthetics."

For while those fundamental requisites which we are so light-heartedly passing by form the crux of what we may call the institutional aspect of the architectural problem of the modern hospital, there is that other side which, though more subtle and difficult to define, is to my mind no less essential, albeit demanding far greater skill to handle satisfactorily. This has to do with the form of the solution rather than the syllogism that determines it. It is more a function of the art than of the science of architecture. And it largely determines the character and quality—the atmosphere—of the resultant building. In other words, it is the solution of the equation in terms of esthetics.

The esthetic phase of the problem of the modern hospital is ordinarily considered as of minor importance and as pertaining to the point of view of the patient only, as differentiated from that of the institution. That this is a distinction without a difference should go without saying; though as a matter of fact there still exists both within and without most hospitals a general impression—or misapprehension—that there are really two points of view—that of the patient and that of the institution—and that the best solution to be hoped for is a compromise between them.

However this may be, the prime requisite from the esthetic point of view is that these institutional demands, and many others not here mentioned, should be met with complete harmony, without architectural disturbance; that all the various functions—clinical, research, teaching—be so comfortably housed under one roof that they may all present their most agreeable aspect to the stranger who enters their household, to the student and teacher no less than to the patient, in one sense the guest of honor.

You see, I am using the simile which lies buried in the word "hospital" itself, and putting the doctor in the position of the kindly and watchful host, not the keen eyed inquisitor—putting back into the definition of hospital the full meaning of "hospitality," somewhat forgotten perhaps in the stress of scientific progress.

Architecturally, this means an interior which shall be cheerful but not exciting; varied but without disturbing contrast; roomy but without the large scale that stamps it an institution. In a word, a building expressing that familiar quality of the individual home to a degree sufficient not only to rob the institution of its tendency to arouse the feeling of strangeness but also to produce if possible a more soothing and agreeable reaction in the patient than in his ordinary lot in life.

III. THE INSTITUTION AND THE PATIENT

And first, with particular reference to this question of esthetics, I want to speak of those so-called two points of view, that of the institution and that of the patient, and their apparent divergence when the hospital problem is looked at in certain lights. For no one else, I think, of all those concerned in the matter of hospital design—trustees, doctors, superintendents, nurses, students or patients—has such a comprehensive and unbiased view of all its aspects as the architect. And withal, because of his own sins I think he can peculiarly well understand the true inwardness of the situation.

For the architect perhaps of all professionals is most tempted in his work, to mistake the means for the end. While the real value of architectural drawings lies mainly in their effect on the building to be produced, they are often mistakenly thought to represent the entire problem; being at the start its only tangible manifestation and the medium through which the designer must work out his solution. And so in studying the plans he sometimes forgets the building.

Thus in a somewhat similar way it is easy for the doctor—and in accord with the popular habit I let him stand here for the institution—to forget the man in treating his ailment. It is perhaps natural for him to regard the situation somewhat as if he had the disease in the hospital while the patient remained comfortably at home, instead of having them wrapped up together in the same bed jacket. And the illusion is made almost perfect when that garment is made of jaundiced gray flannel, presenting to the eye a sight exactly analogous to the smell of ether and iodoform—a garment, in short, just such as you would expect a disease to wear, and a correspondingly complete disguise for a human with red blood in his veins and a heart with cockles crying to be warmed.

But to the layman the patient appears as a combination of a man and a disease, presumably brought to the hospital to be separated one from the other. The rather obvious point I wish to emphasize once more is that they do enter the hospital together, however they depart.

Quite naturally the doctor and surgeon may be inclined to speak of "cases," and catalogue the man under the name of his ailment. It is natural and convenient, the necessary practical custom, just as we architects deal with our problem in terms of draughtsmanship and habitually think of them, I regret to say, as plans and elevation, in terms of two dimensions instead of three, and thereby make some of our most grievous blunders. Hence it is that an architect can speak with a certain professional sympathy on the text of this paper, "In treating the patient, do not forget the man."

IV. THE "HOSPITAL ATMOSPHERE"

I think it safe to say that no one expects to experience a sense of pleasure on entering the ward of a hospital. It would be unreasonable to expect the fundamental fact of sickness and suffering to be obliterated by a cheerful environment; but that the emphasis can and should be put on the hope of recovery and the joy of life seems axiomatic. And the point I wish to make, again, is that in seeking to accomplish this end we should make use of the physical environment no less than any other therapeutic agent. Make the hospital ward a tonic in itself, adding an esthetic section to materia medica.

After many weeks spent in visiting institutions throughout Europe, the impression made by the ward of a recently completed hospital in London still stands out vividly in my memory. The room was rather low ceiled, and made no architectural pretense. But the sunlight came through prettily dressed windows and fell on stands of flowering plants, while the reflection of a brisk open fire danced on a dark polished floor. And lying in brass-knobbed beds, crisp and fresh against warmly tinted walls, the patients themselves provided a finishing touch of cheerfulness by wearing bed jackets of hunting pink. It was positively festive. In the midst of smoky London, and in the heart of a great institution, it gave one a shock of pleasant surprise. My first impression was that we had made a mistake; and the next, that if we were really by chance in a public hospital ward I should be more content to be ill under such conditions than well in most other rooms in London. Of course I knew better than that; but such was the mental reaction, distinct and immediate, and in radical contrast, to experiences in a hundred other wards.

For any one, I think, who has seriously studied hospitals must acknowledge that in most cases the doctor, with the help of the trained nurse and an equally efficient mechanical plant, makes his cures in spite of rather than with the aid of the atmosphere immediately surrounding the patient in the ward. To realize this you have only to ask yourself how the ordinary hospital ward would affect its inmates if they were placed there without the doctor, without the trained nurse, and without all the other special aids to efficient treatment and bodily comfort.

While a hospital is obviously and essentially a place to get out of, it should equally be a place into which the sick man is eager to go; and the presence of one and the same quality in the building would aid materially, I hold, in producing both these desirable characteristics. And it is of this "quality" and the relation it bears to all hospitals, and their design, that I shall now particularly speak.

The first and very obvious fact is that while there must always be "institutions" as well as "a public" to serve, there can be no longer two different points of view. The interests of the two always are and have been, of course, identical. The trouble has been rather with the eyesight—a matter of astigmatism, or more accurately speaking, "double vision"—fortunately of the kind that decreases with the years, as its causes are eliminated. But its genesis in the case of the patient is historical and dates back to the days of Bedlam and the Hotel Dieu—the days of chains, straight jackets and pens, and of four, or even six, in a bed. And all this, let us remember, only a few generations since. Let us acknowledge, then, at the start, that the hospital has a gruesome reputation to live down, however undeserved it be today. That the inheritance was partly bred of ignorance and superstition is immaterial. As a matter of fact, to a certain extent the masses still have a tendency to mistrust and fear.

After all, taking a man out of his home, however poor it may be, is transplanting him, and means that he must find himself again in the new environment. The sheets of the hospital bed are cleaner, even finer, perhaps, than his own; but he has got to warm them up, nevertheless, before he can relax between them. The poorer he is, the more startling the contrast between the impersonal institution, high ceilinged, vast, mechanical and unresponsive, and the tiny room he has left, stuffy, dirty and ugly, if you please, but thoroughly vitalized through personal use. To leave it for the average hospital ward is like changing from a comfortable dressing-gown to a ready-made suit of oilcloth several sizes too large. The less educated, the less intelligent he is, the more he depends on sensuous feelings for contentment. Sensuous ideas, the first to emerge from the mind, are the first to arouse delight, and constitute primitive happiness and content.

After the patient is warmed and fed, the sense of color may quite conceivably make the strongest appeal for gratification. And what is there in the conventional hospital to gratify it?

The answer is "complete asepticism"—glistening tile, white marble and glass, nickel and enamel paint, iron furniture, windows without curtains, mechanical ventilation, invisible convected heat to the exclusion of the radiant open fire, or even the reddening stove.

And on all sides our friend the gray flannel bed jacket! Perfect asepticism, with not a germ in sight, in many cases not even the germ of comfort!

Such conditions are, I think, already changing; but a ward designed with any real esthetic consideration is still rare.[1] And such consideration, when it happens at all, is largely superficial. Given the size, shape and general character of the room as determined on the lines of the most efficient service of the doctor, nurse and orderly, the architect is indeed permitted to make the best of the conditions. But his treatment of the problem must not involve additional expense, either in first cost or upkeep. So that any stray element of beauty that may find lodgment in the crackless walls of efficiency and asepticism is oftenest a hazard of fortune, a by-product at best of the architect's design.

It is a fair question whether there is not a larger efficiency to be considered, and whether the price of perfect asepticism is not too high. For in spite of all its modern improvements, when you send even the intelligent patient to the hospital you have put him in the incipient stages of mental gooseflesh, whereas the prime requisite of the hospital, after all is said and done, is that it should inspire confidence and hope. And surely this requisite, this quality in the institution so closely analogous to personal magnetism in the physician—what I might call its own "personal appeal" to the public—should be the wider and more compelling just in proportion as its scientific efficiency increases.

Is there no way in which this result can be more generally assured?

Personally—speaking always as a lay observer—I believe that it can be done; not only without material expense, but also with ultimate economy in the operation of the hospital. This is, I admit, a difficult thing to prove. Our argument must necessarily be based on *a priori* reasoning, on common sense and a study of the effects of environment on the normal man, both cultured and uncultured, all of which is beyond the scope of this writing, as well as the writer's knowledge. But there is already sufficient testimony from high medical sources to establish the serious importance of the matter. Sufficiently so, I think, to reduce the debate to a question of degree—the general principle being admitted—the degree to which consideration of a patient's mental mood, as it reflects the reaction of his senses to environment, can profitably be carried.

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[1] A noteworthy exception is found in two units of the Indianapolis City Hospital (Bare Walls and Monotony, Current Comment, THE JOURNAL A. M. A., Dec. 5, 1914, p. 2049).

For in the last analysis the problem is of course an economic one. And if it were only possible to make tests of one and the same patient under conditions identical, except as to that of his immediate environment, it would be a simple sum in arithmetic to answer the question beyond peradventure.

V. EFFICIENCY AND FIXED CHARGES

Unfortunately, all we can do at present is to show how small need be the benefit to the patient in order to justify a considerable expenditure in making his environment as stimulating as possible to his recuperative instincts. To this end let us capitalize a small fraction of the time during which the sick man uses the hospital, considered as a huge machine, and see what the saving of it would mean financially. Let us look at the matter for a moment from a purely commercial point of view.

The real efficiency of a hospital, I take it, is measured by the rapidity with which it discharges its patients with relation to the cost involved therein, and the degree of permanency of their betterment. In other words, the efficiency of the hospital, like that of the industrial plant, is measured in terms of its "production costs" and the quantity and quality of its products. But where the industrial corporation considers the interest on its invested capital as one of the fundamental items in its accounting, the hospital, having no stockholders, naturally assumes that its efficiency is practically determined by its current operating cost, quite regardless of invested capital, sinking funds to cover depreciation and obsolescence of plant, and the various other items which go to make up the fixed charges of a commercial corporation.

Taxes on hospital property are remitted, of course; and while from one point of view it is permissible for the hospital to disregard likewise the matter of interest on funds donated for its perpetual use, it might be better if such institutions were to look on their endowments in the light of invested capital whose stockholders expected an interest return on their stock.

Let us consider then, for a moment, this vital element in its economic relation to operating expenses and see how such a point of view would affect our statement of "cost per patient," particularly as an index of real efficiency. For the figures ordinarily given in hospital reports as the cost per day per patient do not in themselves by any means record the efficiency of the institution. Such figures mean little except when taken in relation to the average time during which a bed is occupied in each case—the quickness with which the hospital performs its function and discharges its patient.

Presumably the better equipped institution—that with the most approved layout and apparatus—will turn out its patients at a smaller cost per day or in a shorter time, or both. The important question, then, is whether such savings are sufficient to justify the additional cost required to effect them. So the real efficiency of the hospital—its power to make profits for the community—can be determined only when in addition to its operating costs we take into consideration the cost of the plant, and the consequent fixed charges under which it must operate, exactly as in the case of a commercial enterprise.

Let us see in the case of the Johns Hopkins Hospital, for example, what the real cost would be per patient per day if the matter were looked at from a purely business point of view and proper allowance made for the use of the plant, and what even a small saving in time would mean in consequence.

The cost of the buildings and the apportioned share of the general land and plant investment used for the indoor service of the hospital totals approximately $3,600,000. Assuming an interest charge of 5 per cent. on this amount, without any sinking fund for replacement, the annual fixed charge would be $180,000.[2] This sum apportioned among 358 beds, which may be assumed as the average capacity of the hospital, would make a fixed charge of $500 per year to be carried by each bed, or $1.37 per day.

This item, which, as we shall see, increases the cost per patient per day by 45 per cent., is nowhere to be found in the Annual Report of the institution. This is but following the general custom of our hospitals; yet in cases where the amount charged as "running cost" is lower than at Johns Hopkins this silent factor is relatively even more important. The inclusion of proper fixed charges in many instances would increase the so-called cost per patient by as much as 60 or 70 per cent.

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[2] The figures on which these calculations are based were furnished by the comptroller through the courtesy of Johns Hopkins Hospital.

Now, the average time of occupancy for each patient is approximately three weeks; and if we were to assume that this could be shortened 5 per cent., it would mean a saving of a full day's interest, or $1.37 for each occupant; and for the average of seventeen patients per year, an annual saving of $23.29 per bed. This capitalized at 5 per cent. represents either an investment or a saving in endowment of $465 per bed; or for each ward of twenty beds, $9,316.

This, however, is only the saving in fixed charges. The same shortening of the period of occupancy would mean a saving also in the actual running expenses (stated in last year's annual report to average $3.03 per bed per day) of $51.51 for each bed; which again capitalized would represent $1,020 per bed, or $20,404 per ward of twenty beds.

Thus, when we take into account fixed charges in addition to operating expenses, the shortening of the average time of occupancy by a single day would represent a saving equivalent to the interest on an additional investment in plant of $1,486 per bed, or $29,720 for a ward containing twenty beds; or for the Johns Hopkins Hospital as a whole, containing 358 beds, the comfortable sum of somewhat over $500,000.

This calculation, it is to be noted—dealing only with the clinical service—takes no account of the collateral savings or advantages accruing to the other departments of the institution. Nor is any attempt made to estimate the financial value to the community at large of the time saved for its wage earners by a quicker return to work.

While a fraction of this $500,000 properly spent would make a vast difference in the atmosphere of a hospital, even one of the size of Johns Hopkins, the question still remains as to whether or not such a metamorphosis would effect the shortening of the average confinement by as much as twenty-four hours in three weeks. And though the amount figured above seems to provide a wide margin to work with, nevertheless for the moment I shall frankly beg the question. Nor will I here attempt any suggestions as to the spending of these capitalized savings, contenting myself with suggesting a line of thought—a point of view that may be worth investigation. From a purely commercial point of view, however, it would look on the face of it as if any increase of investment cost per bed less than $1,486 which would shorten its average occupancy by one day out of twenty would be obviously a good business proposition.

So for the present the sum of "somewhat over" $500,000 may remain in trust until I have time to prepare a second paper, after consultation with the doctors and psychologists, patients and nurses, dedicated to the purpose of spending it. Meantime, I might as well confess, I am keeping the trimmings, the "somewhat over"—the sum of $31,988, to be explicitly frank—with which to provide at once open fireplaces, window curtains and pink bed jackets for the entire hospital.

VI. THE INSTITUTIONAL ATTITUDE

I am afraid, however, that my good intention in these respects, even though gratuitous, will be met with objections from the authorities. Open fires make dirt and chimney flues harbor germs, enticed, one must assume, from their present spacious suburban dwellings in the ventilating ducts. The hunting pink bed jackets show spots, and the window curtains are nothing short of an insult to the aseptic school of thought, and would cost a lot to wash, besides; to which I cannot refrain from replying, that both bed jackets and curtains being hypothetic, there is scarcely any chance of their ever getting dirty, and hypothetic washing would cost nothing if they did. And besides, if the dust is there why not catch it with the curtains anyhow?

But this whole matter of asepticism I am going to leave to the doctors, including the question of glistening tile and paint. For I suspect a certain amount of sympathy in their attitude in this matter. I have been secretly advised that because certain conditions in hospitals are general they are not necessarily right; that possibly the aseptic pendulum has swung too far; that cold white walls, even in the operating room, may be a mistake from an entirely practical point of view.[3] And as I reflect with what shocking clearness the dust shows on our black piano lid, I wonder whether these doctor friends are not right and take courage afresh in consequence.

As to the source of such objections as just cited, merely as typifying the ordinary point of view held by most hospital authorities, I cast no aspersions; although in passing I am tempted to take a deprecatory whack at the hospital superintendent. Not that there is any personal feeling about it—merely a matter of racial antipathy. For the superintendent is a fellow whose existence depends on lavish economy in other people's affairs, while the architect lives, of course, on wise and economic expenditure—expenditure anyway—oftentimes by these same "other people."

So even against these minor reforms, the efficient hospital superintendent will probably protest. From his point of view all these homelike things complicate; even walls of good texture and pleasing variety of color throughout large buildings mean trouble and expense in redecorating. And after all, he says, while you and I appreciate such things, the average patient would never know the difference. And herein he has usually been backed up by his board of trustees.

This is their manner of saying that the sense of beauty is a cultivated, not a natural sense; or if natural, then at any rate a negligible one. Whether this does not put the cart before the horse, the sense of beauty being the vital moving cause of all culture, is not to be discussed here; nor is it perhaps worth discussing at any time. But we are very presently concerned with the practical consequences of a theory which teaches that while the senses of heat and cold, of smell and hearing and touch, are to be reckoned with and respected—like all other bodily functions—the sense of sight needs no consideration; that the eye can protect itself.

I do not especially blame any of these gentlemen. It is more in sorrow than in anger that I point out the fact that if any of them were to scent an unpleasant odor in the ward (ether and iodoform are here classed by courtesy as "pleasant") they would be shocked; and still more so if they were greeted with distracting noises at every turn throughout the hospital and were told that both the smells and the noises were part of the hospital environment to which patients soon got accustomed—had to, in fact, unless they held their noses and kept their fingers in their ears. And what would they say if told that sick people of the class that come to hospitals do not notice smells and noises anyway?

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[3] For example, the walls of Carrel's operating room in the Rockefeller Institute are painted very dark gray, almost as black as the sheets, gowns and masks used to cover the patients, assistants and the surgeon himself.

Yet when I claim an analogy between discordant esthetic conditions, in color, line and form, and the corresponding reactions of the senses of smell and hearing when irritated by what we call smells and noises, they will dismiss it quite likely as an academic question. Furthermore, it will doubtless be claimed that even if this be true, we are all used to "visual noise and smells," particularly in the case of those liable to become ordinary hospital patients. And this, one must acknowledge, is more or less true. For while society recognizes noises and bad smells as evils against which the individual should be protected, and includes the boiler and the glue factory, the brass band, and even the church chimes, in the nuisance clause, discordant, hideous forms and colors are not mentioned. While, in short, the sense of smell and sense of hearing are protected, the sense of sight is left to protect itself, or grow callous. I admit, then, that the hospital patient is accustomed to more or less ugly and disturbing surroundings.

On the other hand, we do not argue that because the sick beggar on the street has not known what it is to be really warm for months he can just as well be left cold when he is taken into the ward. As a matter of fact, he is apt to get a special dose of hot things. And that even this same beggar would not react—subconsciously if not consciously—to a radical change of visual environment—that he could not feel the difference even though he could not consciously appreciate it—I am prepared to question.

My point here is fairly well supported, I think, by the example of the negro and the primitive savage. Even the simple minded country bull has an opinion in this matter of color. And his opinion is at least entitled to respectful consideration. At any rate it has always received it.

Of course I am not speaking of those niceties of value, color and form that one ordinarily correlates with the words "esthetic" or "artistic"; nor of architectural scale and design where the case is less obvious than in the matter of color. The appreciation of form is higher up in the scale of sense perception. But because we have not as yet recognized its presence except in the so-called cultured human being is no proof that it does not exist, even in the average hospital patient.

Again, the attempt to capitalize the glow of the open fire and the brass knobs on the beds may be challenged as far-fetched. But think for one moment what the world pays to satisfy the esthetic instinct of mankind. Are the billions spent annually for such purposes merely colossal extravagances—simply unrelated madness exhibited by nine tenths of the human race? When commercial greed plays on such sense instincts in a thousand ways, for the single reason that the satisfaction of their hunger pays rich dividends, can you say that such "feelings" are negligible, have lost their power to respond when we need them for higher purposes, as an aid in the alleviation of suffering, a stimulus to life and happiness? For centuries Mother Church has known and used them to the utmost—music, incense, stained glass windows, wondrous architecture—as a mighty aid in her work of exaltation. Why then should Medicine admit them to the hospital only on sufferance?

VII. CONCLUSION

The generic function of architecture is, of course, the proper housing of the human race, in sickness as well as health, and I venture to say that there is today no greater field of prophylaxis against disease. It is fast becoming so recognized in all civilized countries. The point I make is, that if the art and science, the esthetics and mechanics, of architecture are useful in the prevention of disease, so also may they be of service in its cure, and that this involves more the art than the science of architecture. For the profession may properly be thus defined, theoretically, as of two departments, after the fashion of medicine and surgery. No less, unfortunately, is it largely practiced as one to the exclusion of the other, nowhere more regrettably than in the case of the hospital, where too often the science has entered to the exclusion of the art. So it has happened that among all the new hospital conditions that have combined to make the radical advances since the days of Bedlam and the old "Hotel Dieu," one looks usually in vain for the esthetic element—a consideration of the sense of beauty. With rare exceptions, the only real esthetic touch in our great hospitals is an accidental one—the trained nurse in her cap and gown. And I venture to say that, considered merely as a piece of decoration, she has done more than any other one thing to counteract the blight of the institutional atmosphere.

The Æsculapian temples of healing were shrines of beauty. Should we then consider the modern hospital as nothing more than a huge shelter provided for the surgeon's, doctor's and nurse's work, as an aseptic workshop furnished with power and machinery, the latest tools and the most perfect equipment and scientific aids to research and clinical efficiency, merely a complex of conveniences and apparatus? Or can we consider it not merely a great mechanism, but a silent agent in the art of healing?

Is this utopian? Is there healing virtue in sunny climates, in the scent of pine woods, in the stimulating sight of lofty mountain peaks? And is the value of such things found only in direct physical results? Is environment powerful only in aspects of nature? Does our sense of sight react less powerfully to walls of cheerless glaring plaster than of sunlit foliage? Must the patient make the effort to shut out the one while he welcomes the other? And is an invalid less sensible to such things than the well man? Is the sense of beauty measured altogether by a man's strength and vitality any more than by the degree of his so-called culture?

Am I wrong in thinking that, after all, the most perfect hospital is the one which most nearly satisfies the requirements of that master of all consultants, Dame Nature, and that diagnosis, operation, treatment, research, are all but a seeking to find the way of least resistance through which Nature shall work? And if this is so can we afford to neglect the least helpful thing even though we believe others more important? Can we yet say through which door of the bodily senses this healing spirit is most apt to come and go? Above all, should we neglect the sense of sight? Or is it mere poetic license that calls the eye "the window of the soul," thus rating vision, psychically, as our master sense? Is it right that the sense of beauty should receive full communion in God's cathedral of Nôtre Dame and a block away be cast out like some dreaded heretic from the Hotel Dieu?

That a profession whose great minds hail medicine and surgery as inseparable would wittingly call in the architect to serve as master builder but exclude him as the artist, I am indeed loath to believe.

"Λαμπάδια ἔχοντες διαδώσουσιν ἀλλήλοις"—"Having torches they passed them on, one to the other." And should it not be today—and always—as it was in the days of the torch race? In his address in surgery on the "Realignments in Greater Medicine," Cushing pleads for the wider cooperation of medicine and surgery and their allied sciences; which, as he quotes from Huxley, "are independent in proportion as they are imperfect." And so he speaks hopefully of the closer copartnership into which the men of medicine, surgery and scientific research are now entering. But must we stop there? Is it presumptuous to suggest that in this business of healing the sick in hospitals, the art of architecture be included as a kind of special partner? Are there not times when in the brotherhood of all the arts and sciences one profession should take the torch from another, as did those Greek runners, proud to be its bearer if only for a moment, eager to advance it toward the goal; content if only it be none the dimmer for his carrying, and ready to yield it in turn to some fresh runner in the race of human progress?

So, while as an architect speaking of things medical I have some fear lest parts of this paper appear to be rather superficial criticism of things beyond the scope of my profession, from a broader point of view I make no apologies. For to my thinking the universality of art, both in extent and intent, enfranchises the craftsman in every domain of human activity in which he renders service—gives each profession a brevet in the ranks of every other. So I feel that in a large sense, even as it is, I speak among confrères.

In such a spirit at all events, encouraged, be it said, by some of those who are today the acknowledged torch bearers of greater medicine, I have thus ventured into its kingdom, asking "safe conduct" for the sake of the Art whose passports I carry.

20 West Forty-Third Street.

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Architecture of the Great Charity Hospital

RICHARD E. SCHMIDT
CHICAGO

Avery

Reprinted from The Journal of the American Medical Association
Jan. 24, 1914, Vol. LXII, pp. 277-279

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AMERICAN MEDICAL ASSOCIATION
FIVE HUNDRED AND THIRTY-FIVE NORTH DEARBORN STREET
CHICAGO

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ARCHITECTURE OF THE GREAT CHARITY HOSPITAL *

RICHARD E. SCHMIDT
CHICAGO

The large charity hospital, which must handle a great many patients at the least possible cost and give them the largest possible measure of intelligent care, should be arranged architecturally so that the physicians, nurses and the common employees can do the greatest amount of work with the least expenditure of time and energy.

These principles have guided most hospital architects and the difference in the arrangement of these great plants in different institutions is due to the valuation by architects of the respective services.

I shall try to picture the ideal institution of this character:

1. The administration department is naturally the gateway to such an institution; it is,therefore, the first building that we enter; the offices are there; the information bureau is there; all business with the outside world is conducted there. It should therefore be convenient to reach.

2. A division of the administration department of the institution is the admission bureau with its examination rooms, its dispensary, or outpatient department, its baths for the admission of patients, its clothes-lockers, and, since all clothing must be sterilized before it is put away, its clothing sterilizer. This business of sterilization is quite a technical one under modern-day methods, including the handling of steam machinery, and should be in the hands of experts. Dressings of all sorts and various materials that go to the operating-rooms and to

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* Read in the Section on Hospitals of the American Medical Association, at the Sixty-Fourth Annual Session held at Minneapolis, June, 1913.

the surgical dressing-rooms must be sterilized. These materials must go to all units of the hospital, however many there are and wherever located, and it would seem an ideal arrangement to have the whole sterilization plant at one place where it could be under the control of people who are doing nothing else but that work, so that it will be done expeditiously, economically and methodically. Thus, the whole sterilization plant would become a unit of this admission bureau.

3. The stores of the hospital, whether papers of pins or cars of coal, must be receipted for by the responsible storekeeper, and these stores are subsequently distributed to all parts of the institution. It would seem, therefore, a good plan to have the storekeeper's office and his store-rooms located at some central point, and as that officer is a part of the business administration of the institution he belongs somewhere in the neighborhood of the administration bureau.

4. Modern humanitarianism is demanding more and more all the time for the convenience, comfort and care of those unfortunate members of society who cannot help themselves, and especially is this true of the sick poor. One of the greatest factors in the comfort of these people is good food, properly, quickly and intelligently served. This means that things which should be hot should reach the patient hot, and things which are intended to be served cold should reach him while they are still cold. We have already suggested that the stores should be at a central point for better distribution, meaning ice, milk and vegetables, as well as the surgical and medical supplies and the household materials, and if to keep these stores at a central point it will add materially to the economical administration of the institution if we have the kitchen and serving-rooms near by.

We have, therefore, another unit added to those which I propose to locate centrally. In many places, especially in the large institutions of Germany, steam or electric trains carry the food from some remotely located kitchen to the various points of distribution in the wards. Experience has taught us that, while these trains are economical and efficient, as to the physical work of transporting food, they are not entirely satisfactory from the point of view of the patient, as the food does not reach the sick in an appetizing and palatable condition. It would seem that a better plan would be to have the kitchen so centrally located that the food could be rushed in an appetizing condition to even the remotest point of distribution.

5. The pathologic department of an institution has come to be recognized as one of its most important factors. The morgue is a part of this unit, with ice-boxes, necropsy rooms, which should be well lighted and comfortable as to temperature and ventilation, and, if there are students to be thought of, and especially if there is a school connected with the institution, a small, well-arranged amphitheater. As all dead bodies are brought to the morgue, it becomes necessary to place on view there the unidentified dead; for this reason a chapel also becomes a part of the pathologic unit, in which services can be held over the dead; this is especially necessary with the poor, who are the sole patrons of these institutions. Many of these cases must be passed on by the coroner; therefore, there must be an inquest-room with witness-rooms adjoining. There are perhaps some objections to having all this array of rooms in direct connection with the laboratory of pathology, but it is inconceivable that the morgue and necropsy rooms should be at a distance from the pathologic department when, as a matter of fact, the moment that breath leaves a human body that body at once becomes a pathologic specimen and, when a necropsy is to be done, is turned over to the pathologists, and since where the dead body is, there must also be the coroner, his witnesses and jurors and the chapel for the last rites for the dead.

In this day most large institutions are fitted in the various units with small auxiliary laboratories in which the simpler pathologic procedures, such as urinalysis, blood-counts, blood-pressures and smears of various sorts identified under the microscope, can be carried on. Many of the simple procedures, however, become complicated at certain stages and the facilities and perhaps the more expert knowledge of the central laboratory must be invoked for an efficient settlement of mooted questions. The central laboratory should, therefore, be so located as to afford ease of access from the auxiliary laboratories in the various units of the institution. Then, too, there are vaccines to be given which are kept in the refrigerators of the central laboratory because the conditions under which they must be kept are exacting and their repository must be carefully watched for correct temperatures. There are autovaccines to be made; these autovaccines must be incubated under carefully directed conditions, in carefully regulated incubators, and the technic of their preparation is most exacting; hence they are always made in the central laboratory. There are serums to be prepared and administered in almost every unit of a general hospital. In the children's department, in the lying-in bureau, in the surgical and medical wards and in the infectious disease quarters, as for instance, the antimeningitis serum and the diphtheria antitoxins.

One can see how necessary it is, therefore, that the pathologic department shall be centrally located to save time and expense in energy.

6. If there is a school or if there are lecture-rooms for large bodies of students, they should also be centrally located because often the material to be used before the classes will come from many points in the institution, and the closer by these points are, the better it will be for patients. Of course, there will usually be small clinic-rooms for small numbers of students. located in the various units, where one or two patients can be examined at a time by half a dozen students under the direction of a demonstrator or clinician.

7. It will depend on many conditions whether there shall be one operating department located centrally, or whether there shall be a number of surgical operating-rooms, each one located at a point convenient to a particular class of patients; as, for instance, one operating-room in the children's department, one in the gynecologic department and often one in the obstetric department; and in the large institutions there is also a genito-urinary department, for many surgical cases of this class are highly infectious. There is much surgical work to do even in the obstetric department—cesarean sections, pubiotomies and the ordinary post-partum repair work. In tuberculosis some of the most satisfactory treatment is now surgical; in tuberculosis of the bones and joints, for instance, and in active tuberculous processes in the intestines or pleura. There is often a certain amount of brain-work that can be done for tuberculous patients nowadays. In fact almost every department of the hospital supplies its quota to the surgical operating-rooms. The medical profession is not

agreed for or against a centralized operating-plant. The cost of administration when the plant is divided into an operating-room for each class of patients is exceedingly high. Nurses and interns must be kept on duty whether or not there is work to be done. The apartments must be maintained in an aseptic and scrupulously clean condition, which takes a vast amount of work compared with the small amount of operating. Some physicians insist that it will not do to bring venereal cases into an operating-suite in which clean surgery is done and in which gynecologic cases are infected on their admission; some general surgeons object to having these cases brought into clean quarters. On the other hand, the advocates of a central operating-plant insist that no case should ever be brought to any operating-room until it is surgically clean and that the vilest venereal operation may be quite as clean as the operation for a ruptured appendix. Eventually the surgeons and medical staff of the institutions will probably be called on to determine whether their operating department may be centrally located in the interest of economy and efficiency as a whole, or whether they prefer to take the hazards incident to a large number of operating units located at widely different points and perhaps maintained under less careful supervision than would be the case in a central plant. It seems to be admitted that prompt, quick and careful transportation of patients even over considerable distances, as, for instance, from one building to another, is not trying on the patients and is not hazardous, as a rule, and in some places recovery-rooms are employed to hold patients until they are in a condition to be moved back safely from the operating-rooms to their own beds.

I have now pretty exhaustively covered the group of units that I think should be located in a central area, easily reached from all parts of the institution. The transportation for everything in connection with this layout can be done through well-lighted and well-ventilated tunnels underground, running through the basement of each building, and these tunnels can also be used for carrying the pipes for the physical service of the whole institution. The tunnel, for instance, can be 16 feet wide by 7 feet high. Nine feet of this tunnel can be used for passenger and freight service and a separate wall can be built up to separate the pipe tunnel from the other structure. The whole tunnel can be made of reinforced concrete, including the dividing wall and the roof. On each side of the pipe tunnel hooks or hangers can be placed, and if 2 feet on each side of this tunnel are taken for pipes, 4 feet will be left for a passage and workway, and this tunnel will contain all necessary pipes for heating, refrigeration, hot and cold water, electric conduits, etc., that are necessary for institution service. Arranged in this way they are easily accessible for repairs, or renewals or any changes that may be required. The passenger and freight part of the tunnel need not be elaborate. A solid concrete floor with smooth finish can be made to answer every purpose, although terrazzo or some of the monolithic or tile floors add to the appearance of the tunnel. The walls can be waterproof cement, white enameled, with a glazed finish, or they can be made of vitrified glazed tile, which is far costlier. The roof can be made of waterproof cement with a glazed finish, white enameled, or treated in any other desired way. Ventilation can be had by air-ducts at intervals, or the whole tunnel can be ventilated by running a shaft into the general ventilating shaft of the institution or by allowing the top of the tunnel to be a few feet above ground with small transom windows for both air and light.

If this general plan is carried out, elevators will be necessary in every building which communicates with the tunnel and is intended to be a part of the general service, but automatic, electric and hydraulic elevators are being made so efficient at present, (and "fool-proof") that they can be regarded as perfectly reliable. Although the cost of installation is a little higher than that of the man-operated elevators, the up-keep is low, as they do not require an elevator man to each car.

There are certain administrative units that will not be required as a part of this central area.

1. The mechanics or transmission of water, steam and electricity are so efficient that the refrigeration, ventilation and steam and electric service of the institution can be conveyed over considerable distances with comparatively little loss of efficiency. If the steam and refrigeration pipes are well covered, and if the electric service is well insulated and the whole transmission system is well installed, there is no good reason why the power-plant should not be located at the outskirts of the land area of the institution where the noise of the

machinery and the smoke and dirt will not interfere with the established order of things in the institution proper.

2. The laundry is in reality a part of the power-plant of the institution. It requires immense quantities of hot water and live steam. It deals with complicated mechanism that should be under the control, operation and guardianship of the engineering department. The laundry should therefore be immediately adjoining, or a part of the same building with, the power-plant and there is no good reason why this should not be the case. It is not very much trouble and takes very little time to transport a cart of soiled linen three hundred feet more or less, or even a quarter of a mile, because large loads can be hauled. An ordinary depot truck with rubber tires and electric motor can be used for the purpose if desired. These are made most efficient now and are in use in all the large depots of the country. They move rapidly, pull large loads and are easily handled. Automatic elevator service can be employed if necessary to locate the laundry over the power-plant and excellent administration technic can be employed for the handling of soiled material into the laundry and clean material back into the building through the tunnel. In most institutions heavy canvas bags, which prevent the spread of infections, are used for the soiled linens and these serve to save the goods from rough handling at the hands of the help. Even the linen-rooms can be located in the laundry if desired, and there is no particular reason why they should not be.

3. The incinerators for garbage from the kitchen suite, which will be vastly greater in quantity than the refuse from any other single unit, can be destroyed either in the fires of the power-plant or in an incinerator near by which will feed its smoke into the regular power-plant used. In most large institutions incinerators are being installed in the walls of the slop sink-rooms of the various units, for the destruction of garbage, dressings, etc., from those units. This system of destroying garbage in the various units will grow in favor and will come finally to be universal if the makers of these mechanical contrivances can devise a plan that will not render their use too costly in gas consumption.

GARDEN & MARTIN, ARCHITECTS

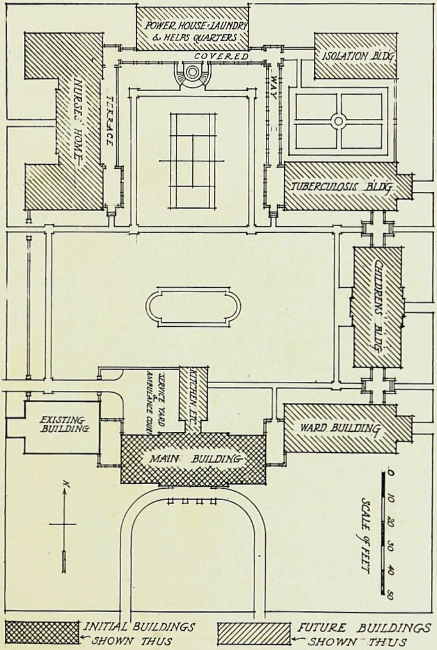
By RICHARD E. SCHMIDT, A. I. A.

REPRINTED FROM THE ARCHITECTURAL FORUM, JUNE, 1919

WHEN the problem of designing a new hospital or the expansion of an existing hospital is entrusted to an architect, it is necessary that he study and analyze the needs of the community in which it is to be built in the following respects: the rate of increase of bed-patients, the numbers treated in the several classifications of diseases and ailments, the past work of an existing institution, and also the probabilities of financial support for a long term of years, holding in view sufficient elasticity to permit of a change in proportion in the probable number of patients, according to the several classifications and to accommodate the ever changing methods of treatment and technique of medicine and surgery. The architect should also examine the surroundings of the site to ascertain the line of least resistance in the acquirement of additional neighboring property if available statistics indicate a probable growth beyond the confines of the site in at least twenty-five years, and develop the ultimate scheme accordingly. All of this must be done in accordance with the most advanced practice of medical service to develop the site to its highest and best use subject to the most modern practice of hospital design.

The sketch studies will be made *en bloc* based on roughly pre-determined units of subdivisions with the necessary auxiliaries, holding in view an ultimate generally pleasing aspect. This the architect should be able to do from ground plans, without developing elevation and details, for clients will, in very rare exceptions, only, be willing to pay for the service of complete plans of the ultimate scheme.

Inasmuch as it is beyond human possibility to anticipate the advances



building improvements for a long
it would probably be money unwise
develop the complete scheme.

The principal element is to provid
efficient operating hospital in its ult
ment with proper and convenient circ
sacrificing these same necessary requ
portion, sometimes comparatively s
to be built and operated as the first u

It is obvious that this presents th
culty and opportunity to the designe
vide all of the auxiliaries and service
portion to the original and smaller nun
without being out of balance in c
consequently in its cost as compared
number, and to arrange the most imp
that they will be suitably and prop
an increasing number of patient beds,
the possible requirement of their co
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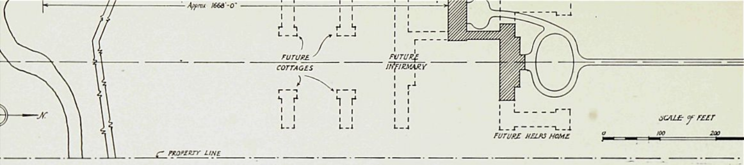
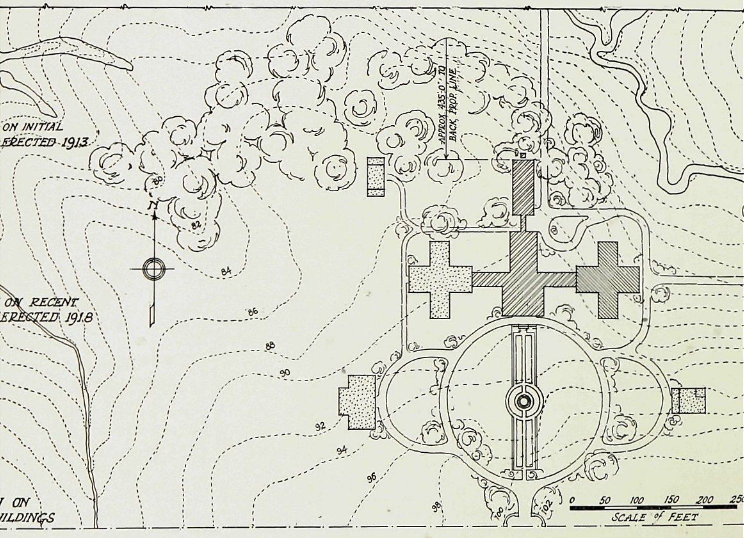


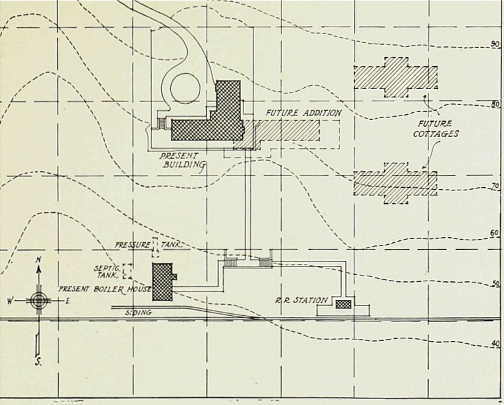
Plot Plan of Adams County Tuberculosis Sanitorium, Quincy, Illinois

o be built, and again some of the depart-
ıch as the operating sections, which are
to install, should be so located that they
panded without removal, or easily converted
e of a special department such as the delivery
a maternity section.
e beginning is comparatively small, the
laundry and heating units may have to be
ithin the first unit, proportionate to the
service, or, in inexpensive one or two-story
which can be sacrificed by removal without
a loss when the time arrives to build a
service and power building, keeping in mind
ient and efficient point of connection of
water and electric services as well as all
vices. (The beginning of Columbia Hos-
lwaukee, Wis., and Home Hospital, Lafay-
, are planned on this basis.)
usly, a separate building of this kind, if
built at the outset, would overbalance the c
patient capacity in size and cost, and in some in
would cost more than the funds available f
entire first unit.

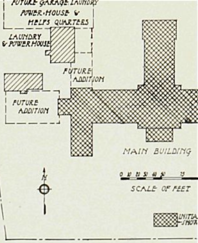
If, however, the portion which is built
inception of the scheme is a considerable pro
of the ultimate size, the service building m
built of sufficient dimensions, with ample sp
the later installation of additional boilers, mac
kitchen and laundry equipment to provide
the original installation, the necessary serv
the completed scheme. (See block plan of D
and Macon County Hospital, Decatur, Illinois.

The Illinois Central Hospital at Paducah
the Pureair Tuberculosis Sanitorium, near Ba
Wis., and Adams County Sanatorium at Quinc
are compromises of the two methods describ
the present and future accommodations fo
service equipment.





Plot Plan of "Pureair" County Tuberculosis Hospital near Bayfield, Wis.



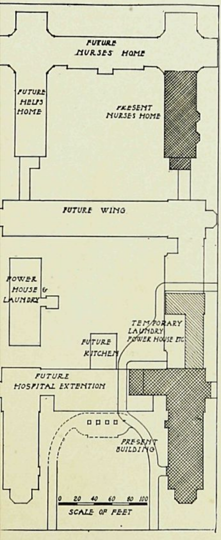
Plot Plan of Illinois Central
Paducah, Kent

It will be proper generally to arrange temporary arters for the services if the initial hospital is to ve a capacity of less than fifty per centum of the timate.

The foregoing statements are more definitely plicable to the low pavilion type, than they are the high city hotel block plan type, which, happily, appears to be declining The latter can be built t tional stories and presents few difficulties to increasi

The architects' proble to place the foundations tion in such a manner t part of the first portions to be built w serve all practical purposes throughou

As stated at the beginning, the s planning will depend upon investigatio start relative to the probable growth of and the foresight with which the princip tration are determined for the buildi



Plot Plan, Columbia Hospital,

View of Columbia Hospital, Milwaukee, Wisconsin, Showing Temporary

Reprint from SURGERY, GYNECOLOGY AND OBSTETRICS, July, 1920, pages 105-110

SOUND DEADENING IN HOSPITALS

By RICHARD E. SCHMIDT, F.A.I.A., Chicago

OISE in any form is obviously objectionable about a hospital; whether or not it is caused by the slamming of doors, the op- of the elevators or ventilating machinery, persons walking, by conversation, or by a t in pain. Complaints regarding this ance are heard about almost every hospital eater or less extent; probably more today ears ago before the use of fire-resisting uction was so general.

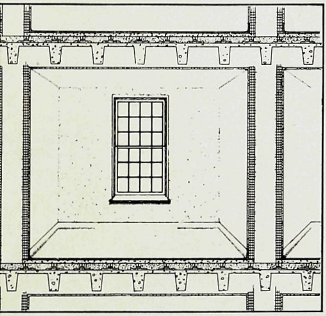
t in hospitals is not a matter of architect- coustics, which are determined by the form rnishings of rooms. The acoustics of halls, rs, etc., are among the rational engineering ms and perfect acoustical qualities, that is, t hearing by every listener can be prede- ed; in hospitals, however, the problem is another matter.

floors, partitions, and walls of buildings of stible construction, which appear to be less are constructed of many pieces and have r air spaces. Building felts and other stible materials are used. Such construc- not permissible in fire-resisting construc- xcept to a minor extent. The numerous air , which help in preventing the passage of , form flues and shafts which accelerate the of fire.

-resisting construction of any kind is prac- vermin-proof, and does not contain the numerous continuous air spaces which afford runways for mice and rats and, therefore, has another point in its favor over combustible construction.

The older form of fire-resisting construction, viz., structural steel beams and hollow tiles, also contained many air spaces. This construction was also fairly sound-proof. With the advent of reinforced concrete construction and the use of a very few hard materials, buildings were soon found to be unusually noisy. The first concrete buildings had solid floor slabs with finished cement floor surfaces and plaster on the under or ceiling side. Therefore, in substance, there was only one material, sometimes only a few inches in thickness, between two stories; hence, sound was easily transmitted from one floor to the other. The so-called sanitary floors, such as magnesia composition, terrazzo, and tile, are also dense and comparatively thin, so that their use does not decrease the travel of sound to any considerable extent when used on such construction.

Newer forms of reinforced concrete construction, in combination with hollow clay tile, gypsum



1. Cross section of ideal construction.

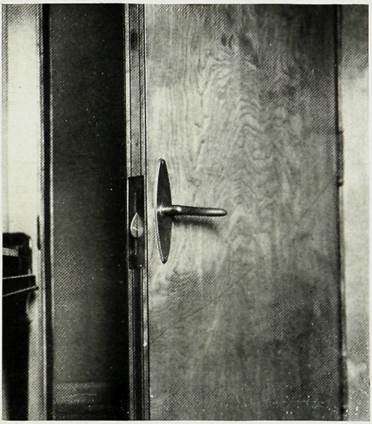


Fig. 2. Diagonal view of one of the Evanston sound-proof doors.

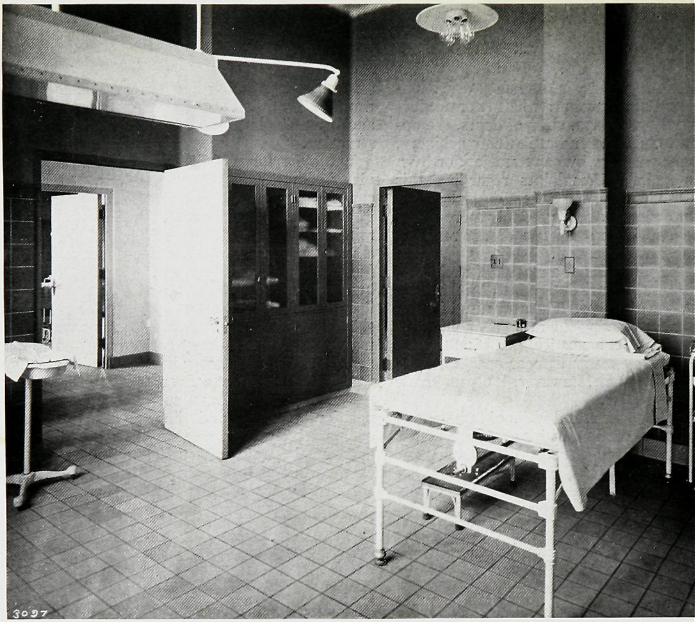


Fig. 3. Chicago Lying-In Hospital, birth room. The doors on the left and right are sound proof. ness and lever handles.

domes, or steel forms which require suspended metal lath and plaster ceilings, provide additional air spaces, which better the condition. Such forms of construction, when used in hotels and apartment houses, are quite satisfactory because of the use of carpets, rugs, and heavy padding under the carpets. Reinforced concrete construction is considerably cheaper than hollow tile and steel, and has almost completely supplanted the latter, because of the greatly enhanced cost of building.

The problem of sound insulation or elimination is a difficult one, and it is necessary to provide sound-absorbing materials. For complete insulation the deadening material must be so thick as to be prohibitive, although relatively thin layers produce an appreciable reduction in intensity of sound transmitted.

Complete absorption of sound, or the prevention of its travel from one room to another, would probably require an arrangement con finished rooms completely insulated or from the rooms adjoining on the sides, corridors and from the rooms above a Such an arrangement may be viewed ceiving a complete building with all walls, floors, and partitions in place wit finished set of rooms within the rough but not in contact with it. Obvious impossible, for the inner finished floors, ceilings must be supported on the floors; but the floors, walls, and ceilin placed on sound-absorbing cushions, wi absorbing connections in doorways and In this way a complete air space wil structed around the room, as shown in Such an arrangement will not be sou however, unless the materials in the fl titions, and walls are of such a nature a

Fig. 4. Chicago Lying-In Hospital.

that sound will not travel across the air es.

is apparent that such a building will virtually ist of two buildings, i.e., it would require ost double the amount of material and labor, cost twice as much as the ordinary building; ost is consequently prohibitive.

he Wallace Clement Sabin Laboratory of ustics at Geneva, Illinois, was built to exclude ound from one portion to another, except as sses through a wall the transmission of which ing studied. The securing of this condition is edingly difficult and the building essentially ists of two entirely separate structures under gle roof. This, together with the fact that it necessary to build it of massive concrete and k construction probably made its cost un- lly great in proportion to the space enclosed. vy steel and ice box doors were used in lieu of nary doors. These doors were placed on two s of vestibules which function as sound locks. ible transmission from room to room by a mon floor construction made it necessary the rooms be separated clear to the founda- The walls of these rooms are of solid onry 18 inches thick, and the foundations ist of successive layers of sand, hollow tile, concrete, several layers of tarred paper, and a concrete wearing surface. Where contact was necessary, layers of felt were placed between adjoining walls, air spaces were left between walls, for, experience has shown that they afford more effective insulation than a reasonable thickness of felt or other absorbing material.

Pasteur's great discoveries were soon followed by a general demand for the use of impervious and non-shrinking materials for floors, walls, ceilings, and all other parts of a hospital, and labor costs required the use of materials which could be quickly and easily cleaned. This demand was met by manufacturers of all classes of building material by supplying dense hard plasters, enamel paints, glazed tiles, white glass, metal trim, metal doors, composition floors, terrazzo and tile floors, all of which excellently served the demand for easy and perfect cleansing; their use increased the difficulty for they have great sound-reflecting power and resist sound transmission very little. Consideration of only one of these materials, viz., wall plaster, will illustrate the effect of the demand. The old form of lime, sand, and hair or wood fiber was rather porous and absorbing but the modern cement wall plaster is much denser and harder, and hard glossy

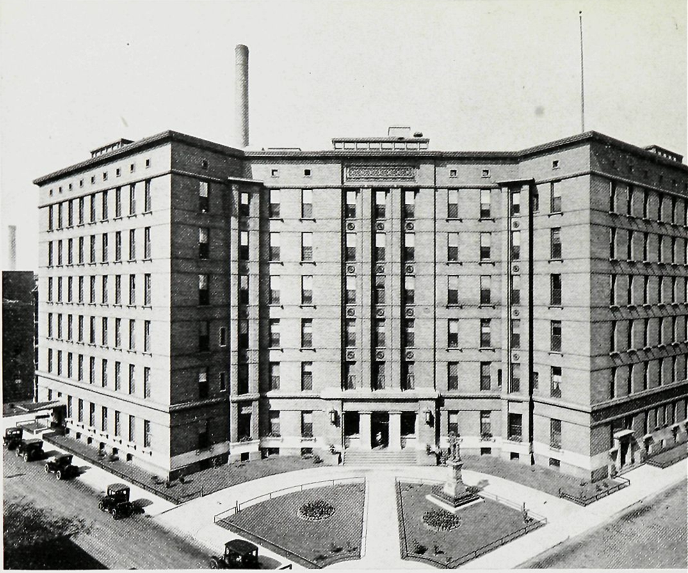


Fig. 5. Michael Reese Hospital, exterior.

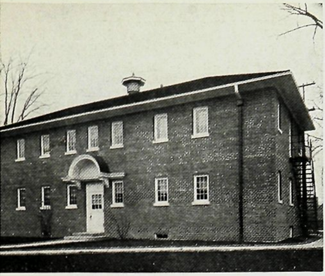
enamel paints increase its reflecting power and decrease its sound absorption.

Thick soft cartridge papers or Lincrusta Walton, or canvas covered felt may be suitable expedients in offices and homes, but are improper for hospital use.

Fire-resisting and sound-absorbing material which has an artistic appearance and which can be molded and ornamented to resemble coarse stone or terra cotta and made in thin slabs or blocks, is manufactured by the R. Guastavino Co., of New York. This material contains innumerable air cells and appears to consist of round grains resembling roe. It is eminently suitable for lobbies, entrances, chapels, and lecture halls, but too porous and expensive for general use in hospitals. It is easily soiled if used within 6 or 7 feet of the floor. Painting would decrease its absorbing power and destroys its natural pleasing color which requires no further finish for ornamental purposes.

To build complete partitions, walls of sound-absorbing material of high ef impracticable on account of expense o tibility and in some cases structurally. fore, appears necessary to build the stru partitions of the materials generally us are the cheapest for building purpose interline these building elements with diaphragms of absorbing material w produce an appreciable reduction in the of the sound transmission.

Felt, felt paper, mineral wool, asbe cork, all of which contain minute air quite effective. Any of these can be floors and covered on the wearing su tile, terrazzo, cement, etc., but it is d use any of them except cork in connec walls or partitions, for it is obvious tha be necessary to build hollow partitions of which is usually double that of t partition. Inasmuch as wall plaster an will adhere to cork and cork can be appl



. Piano Practice Hall of Northwestern University
of Music.

f a partition or the underside of a ceiling, t walls and on floors, this material in the f compressed sheets, appears to be the most le and reasonable in cost. It has been used sfully for all sides of operating, delivery, bor rooms, and after the plastering and floor es were applied their appearance does not from the ordinary tiled and plastered room. ther to confine and absorb sound originat- these rooms, special sound-proof doors are These doors are built up of two thin wooden joined by small metal spacers forming an ace partially filled by a thick sheet of felt. pace between the two doors also contains a elogram of steel bars operated by the lever e of the latch, which presses strips of com- d felt against the three sides of the frame he floor when the door is closed and the is pushed downward, and simultaneously es the door latch with the strike plate. doors are made under patents of Irving in, of Evanston, Illinois, and have func- satisfactorily in Michael Reese Hospital ying-In Hospital, Chicago, and the Piano ce Hall of Northwestern University School sic (Figs. 2, 3, 4, 5, and 6).

s is a superior door for telephone booths, asmuch as it hermetically seals the opening also be used to advantage for vapor bath , for communicating doors of suites and rooms and to facilitate fumigation or dis- on.

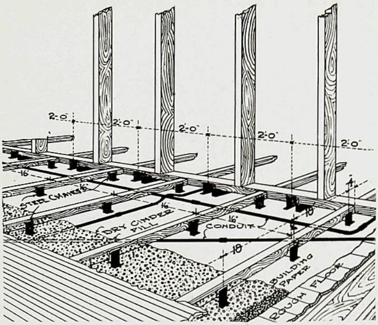


Fig. 7. Perspective of Stevens' system of floor deadening.

ecod, a proprietary combination of pow- and fibrous materials mixed with Portland t, sand, and water, makes a plastic mortar ets and forms a tough elastic mass filled ir cells, into which nails or screws can be driven as rapidly as into wood. It is verminproof, fireproof, light, and quite sound-absorbing and furnishes an excellent base for flooring of all kinds. Its elasticity compensates the varying rates of expansion and contraction of the structure of a building and composition, terrazzo, mosaic, tile, and other forms of flooring, and is, therefore, a valuable additional building material.

Hardwood flooring, if laid on Nalecod, in pieces 16 or 18 inches in length, in herringbone pattern, and thoroughly finished with wax affords an excellent sound-absorbing floor, which will not shrink to such an extent that it will have open joints of the dimensions which has made wood flooring in its ordinary form objectionable for modern hospital use.

Stevens' system of floor deadening (Figs. 7, 8, and 9) has been unusually successful for use in apartment houses and hotels where wooden floors have been used, and inasmuch as a filling of dry cinders is used in lieu of the customary moist filling, containing cinder concrete, wood floors do not shrink to the same extent as they do when used on the older form of construction. It consists of small metal supports or chairs, which are bedded in cement mortar about 18 inches apart and support wood nailing strips in U-shaped recesses lined with felt. These strips, to which the flooring is nailed, are placed 16 inches from center to center. The space between and under the nailing strips is filled with a course of clean dry steam boiler cinders to a depth of about 3 inches. Partitions can also be supported on similar chairs and assist greatly in stopping the transmission of sound.

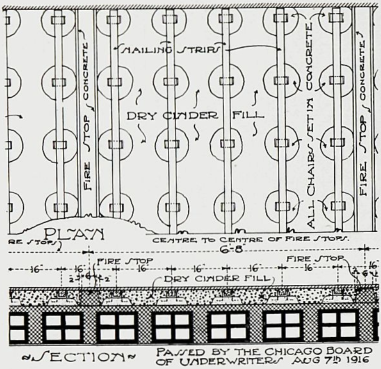


Fig. 8. Plan and section of Stevens' system of floor deadening on fireproof construction.

Elevator, ventilating, and other machinery should be placed in insulated rooms, on special pads formed of cork, wood, and felt in alternating layers or combinations of Stevens' padded chairs and strips which can be used in sufficient number to carry heavy machines.

Pumps, fans, vacuum pumps, and other machines should be connected to pipes and ducts by flexible rubber, felt or canvas connections, whichever may be the most suitable; these, and felt curtains hung in chambers in connection with large air ducts, will absorb sound which would otherwise be transmitted from the machinery to remote parts of the building.

The electric control of elevators need not be in spaces directly connected to the elevator shaft, but can be placed in insulated chambers at any convenient point, however distant from machine.

Noise caused by electric switches in making and breaking contacts is particularly penetrating, especially during the night when general noises do not prevail.

Elevator shafts should not open on room corridors, but, on a separate hall or entry, inasmuch as the noise caused by the latch of the metal shaft doors and of the elevator is difficult to eliminate.

Latches should be omitted on interior doors and they should be equipped with a good check and spring to close them noiselessly. If so arranged they can be pushed to open in one direction and if suitably shaped hooks are provided on the other side of the doors, they can be opened

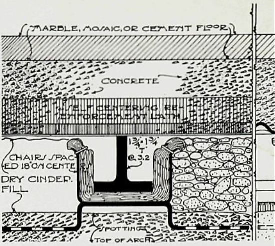

MARBLE, MOSAIC, OR CEMENT FLOOR
CONCRETE
SELF CENTERING RE-ENFORCEMENT LATH
1¾-1¾ T @ 3.2
CHAIRS SPACED 18" ON CENTERS
DRY CINDER FILL
SPOTTING
TOP OF ARCH

Fig. 9. Detail of Stevens' system of floo fireproof construction.

in the other direction by the forearn permit a nurse to carry a tray or article in both hands.

Corridors are magnified speakin sound will be reflected from walls, floor, first from one and then from an some little sound at each reflection continuing from end to end. Inasm are a comparatively small number corridors, no draperies, and almost or projections, and as the wall and cei and floors are hard, very little sound

Dividing their length by partition but partitions of ordinary constru obstruct light and are, therefore, n but conditions can be bettered con placing partitions of light steel a intervals. These do not obstruct lig doors are wide, double acting, and t protected by push bars they do no obstruction to travel. Obviously a a corridor without windows should by mechanical means.

Of all the floors in a hospital, the c require deadening the most. Not they be insulated to prevent the tra to spaces under them but sound cau ing should be absorbed before it patients on the same floor. Loos rubber or matting are objectionabl reasons and it is wasteful to cover a terrazzo floor; it, therefore, seems m to arrange recesses in the hard mat same thickness as sound-absorbin such as cork, rubber tile, linoleum and to cement these solidly to a c inexpensive Portland cement base, o Borders of hard material are ad desirable on account of easy clean tractive appearance.

RICHARD E. SCHMIDT, F.A.I.A.

CHICAGO

g an office for the physician with a large prac-
points should be kept in view. A waiting room
mensions with an interesting outlook and attrac-
hed and decorated should be provided. In a suite
several physicians, it may be necessary to have
he reception room in addition to the telephone
any plan it is de-
ave the patients'
accessible to the
t records may be
the physician in
nce and in advance
sion of the patient
sician's office. The
r an inside private
th an exit other
ough the reception
ious. There is the
ether there should
amination or treat-
and more dressing
r than a large num-
mination or treat-
with no dressing
arrangements oc-
the same amount
the latter appears
atisfactory.

an office in a new
bviously more ad-
han to locate it in
building, as con-
es, pipes for water,
e and air can be
hind the plaster or
, and extended to
diately adjacent to
sulting in the neat-
nent; where-
ld building
hese service
be extended
of the walls,
disfigure-
quiring addi-
to keep them
table condi-
a physician
ase of office
the building is in an early stage of construction,
lumbing and heating pipes and other work can
in concealed places without the loss caused by
existing work. Furthermore, outlets may be
diately adjacent to the equipment, and there are
pipe extensions.

ion of materials for walls, floors and finish
he use of the offices. For treatment or surgical
standard for hospital work should be used; if the
rely consulting or medical, any furnishing or fin-
or high grade business offices will be satisfactory.

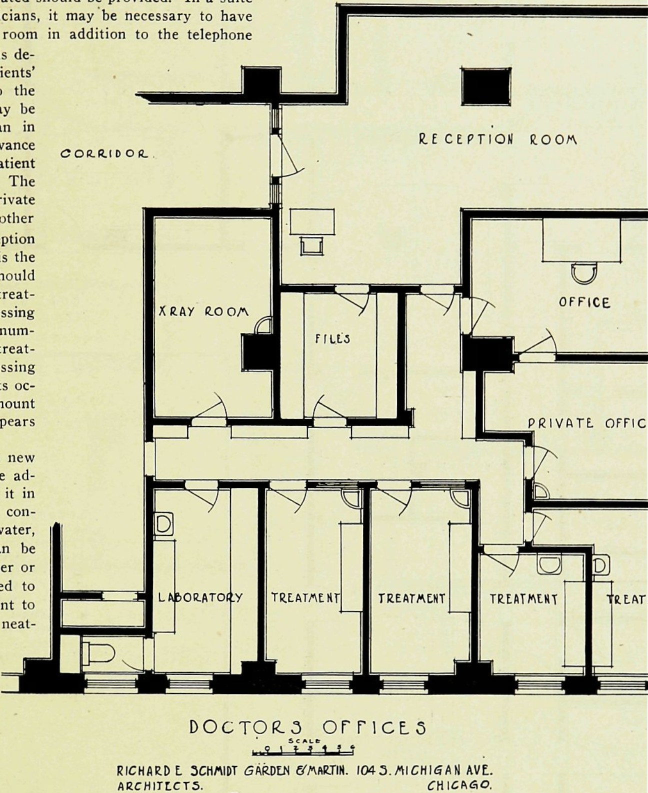


Fig. 1.—Physician's suite. The special features here are the number of treatment rooms with absen
sing rooms, placing of instrument cases in corridor, and proximity of file room to recepton room attend

In the physician's suite illustrated in Figure 1, t
floor (1,635 square feet) is tiled with 1¼ inch white
mosaic tile, with rugs in the waiting room and in th
office. The walls and ceilings of the private corrid
the treatment rooms are finished in gloss white enar
long walls of the filing room back of the bookkeep
are filled with steel safes for records. In the private
are 25 lineal feet of instrument cabinets, extending f
to ceiling. These cabinets have sliding doors and
arrangement by which instruments are suspended fr
bars and placed in regular order, according to t

truments arranged in this way are found more quickly n if lying on shelves or in drawers.

he roentgen-ray room is arranged for complete roentgeno-ic treatment; it also contains a plate display box. The oratory is equipped with microscope stand, centrifuge, stant temperature water bath, gas and electric sterilizer, rigerator, incubator, water still, and specimen and other binets. All of the treatment rooms in this suite have nning water and modern enameled metal equipment and rniture.

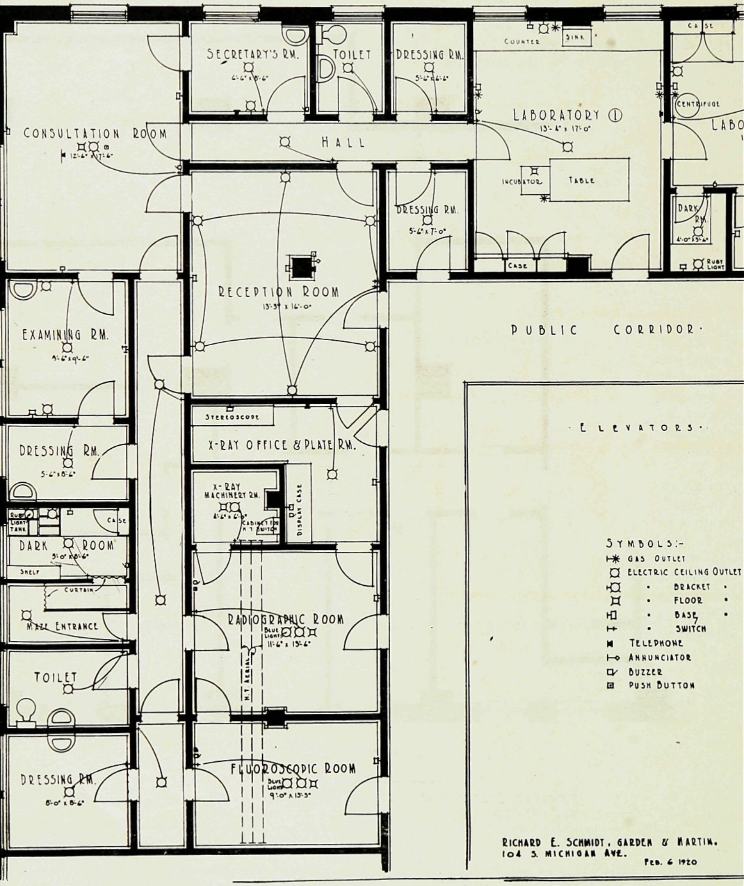
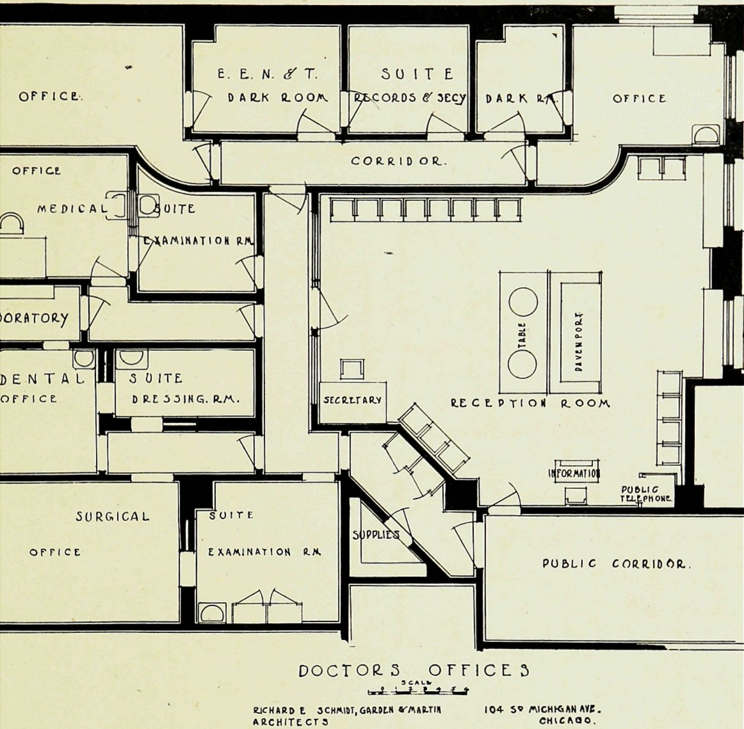


Fig. 2.—Noteworthy features here are the liberal size of the laboratories, roentgen-ray, consultation and reception roon nent of roentgen-ray rooms and auxiliaries.

The office illustrated in Figure 2 is located in a new office ilding where the space permitted an excellent and liberal rangement. The roentgen-ray department has a suite con-sting of office and plate room, machine room, roentgenographic room, fluoroscopic room, dark ro dressing rooms. There are two laborato has a separate dark room and a small olism tests. This small room is equippe respiration apparatus. The laboratory is e clave, still, centrifuge, incubator, etc. The equipped with call buttons, buzzers and i and city telephones. The installation of ru laboratory and dark room sinks is unusu conveniences and appointment will obviou by the public and by the physician, becau with which service can be rendered.

Figure 3 shows how a suite of offices w existing building. This group of offices a epresenting, respectively, medicine, surgery, den- e, ear, nose and throat. Each office is completely ith the equipment adapted to its particular ser- l be noticed that three of the suites have patients' oms with double exits. The private corridors

furnish necessary intercommunication and exit from One of the important features in connection with t of offices is an exceptionally large and attractive room.



Suite of offices for four specialists. Note the liberal dimensions of the reception room, also convenient arrangement of e roat suite for eye work.

Reprinted from The Journal of the American Medical Association
Aug. 28, 1920, Vol. 75, pp. 627-629

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American Medical Association, 535 N. Dearborn St., Chicago

HE RESEARCH AND EDUCATIONAL HOS OF THE STATE OF ILLINOIS

PART ONE

FROM THE STANDPOINT OF THE UNIVERSITY

By DR. ALBERT C. EYCLESHYMER, Dean of the College of Medicine, University of I

Part I.—From the Standpoint of the University. By Dr. Albert C. Eycleshymer, Dean of the College of Medicine, University of Illinois.

Part II.—From the Standpoint of the Department of Public Welfare. By Charles H. Thorne, Director of the Department of Public Welfare, State of Illinois.

Part III.—From the Standpoint of the Architects. By Schmidt, Garden and Martin, Chicago, Illinois.

THE prevention of disease is now receiving greater emphasis than ever before. It would e impossible to enumerate the many factors vhich have brought this about, but there are ome which stand in the oreground.

Our minds are filled vith terror as we recall he fearful plague which o recently swept over he world, in the form of nfluenza and its companion pneumonia. A vriter in the *London Times* states that in less han four months the otal number of deaths eached about six millions; in India alone three million deaths occurred. t is estimated that the World War in four and ne-half years was responsible for twenty million leaths. The same writer estimates that this plague would have taken upwards of eighty milion lives in the same length of time. Just as nedical science worked away on diphtheria, maaria, typhoid fever, typhus fever, smallpox, yelow fever, and bubonic plague until these diseases vere controlled or eliminated, so it now realizes hat it must do everything within the range of numan power to intercept the recurrence of this idal wave of death.

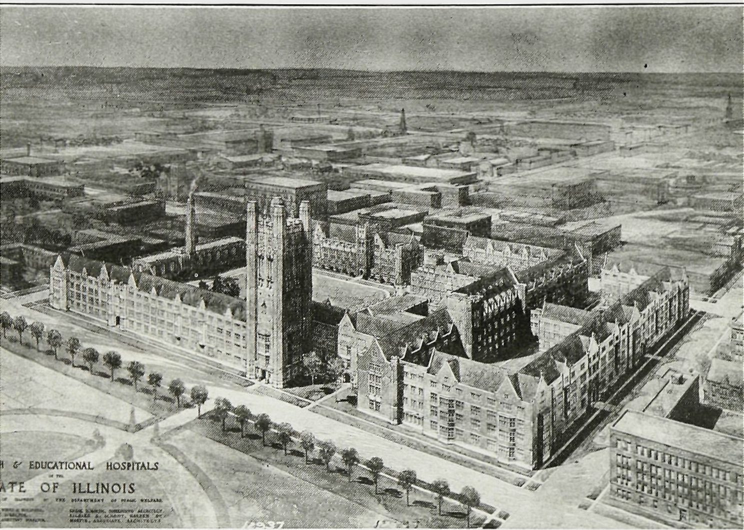
Another important factor is found in the starting revelations of the Medical Examining Boards of the Army and Navy. These boards, on first examination, found a large proportion of our young men unfit for military service. As the sifting process continued, it was found that nearly ne-third of the young men of our country were disqualified, on account of physical defects. This condition has awakened the medical profession to he need of periodical medical examinations and o the necessity of introducing more physical raining in our educational and industrial organizations.

The least accentuated, but the most substantial actor of all, is the growing recognition by the people, of the fact that efficiency is largely a quesion of health, and that health conservation, there-

greatest statesmen, sociologists, ph others have repeatedly voiced thi William H. Taft says: "I hope to l time when the increased efficiency i ice—federal municipal— itself in a duced death Senate doc ing to the of human l Roosevelt preservatio vigor shoul of patriotis ument of t President "The real t to conserve in America is the A ple, their energy, their elasticity, ative power, their capacity to achieve."

Irving Fisher, one of our greatest l ties on infant mortality, says that hundred thousand deaths of infants nearly one-half, might have been pr laws of hygiene, as known today, served. He adds that the science o vention, if properly applied, will ad to the average human life. Scient widely erred in assuming that th cycle of man should be not less t one hundred years. It costs no m man capable of reaching this age, t grow one who has not the capacit be forty years old. The medical reached a point where it realizes has scarcely begun. Col. Franklin National Council of Defense, voic ment before a gathering of the mos geons of the world, when he said: of the future will be practiced rat of irrationally. . . . . . Ou mainly to keep people well inste them when they are sick."

The line between dependence an is drawn on the ability of the ind day's work. He who cannot work



A birdseye view of the group of Research and Educational Hospitals of the State of Illinois.

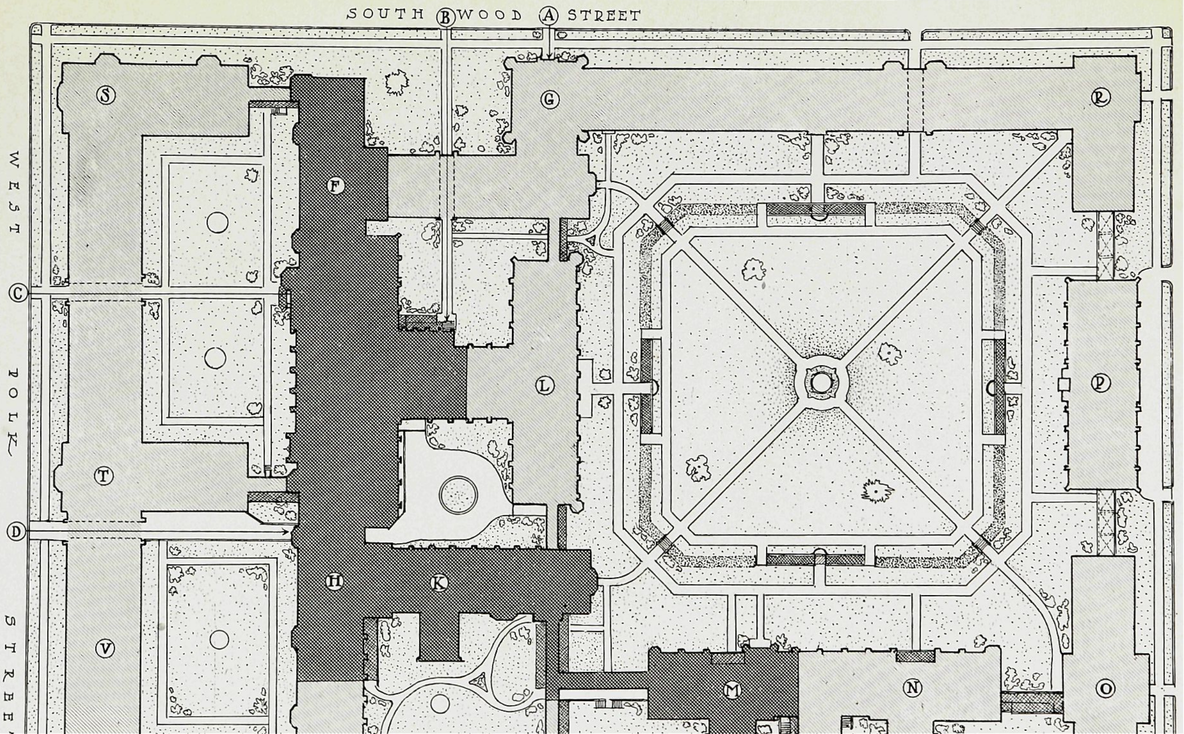
ion and care of the sick and infirm were
ich the practicing physician assumed in
r days; but the burden of caring for
oor, the insane, and the criminal, gradu-
ne so great that community sanatoriums,
asylums, and prisons were established.
se beginnings, there has developed a
nber of state and municipal institutions
are of the poor who are physically or
ill.

ois there are several organizations, sup-
public funds, which are working for the
safety of the state. The more important
the Department of Public Health, the
ent of Public Welfare, and the State Col-
Iedicine. No one who has given consid-
the problem of housing and caring for
poor of the state, can escape the conclu-
he Director of the Department of Public
that we must unite our state medical
in a greater organization which will be-
out delay, the study of the sources of
eams of human wreckage which threaten
erge the commonwealth. The coopera-
proposed by the director of the Depart-
Public Welfare, met with most hearty
by the University of Illinois. Some no-

proved of a cooperative organization whi
fair to eclipse all others.

The University of Illinois assumed defin
trol of the College of Physicians and Su
on March 5, 1913, and immediately beg
organization of its present College of M
In two years it had placed the lab
branches on a university basis, and it th
deavored to secure funds to place the
branches on the same basis. A number o
during the past five years the president ar
tees of the University have taken definit
to provide a clinical building, but adequat
were difficult to obtain. The last General
bly, however, appropriated $300,000 for t
struction of a clinical building. This b
will be devoted to the treatment and inves
of those diseases which belong in the f
general medicine, surgery, obstetrics, an
cology, but it will not provide for the t
and investigation which must be developed
nection with the specialties, such as dise
the eye, ear, nose and throat, venereal d
tuberculosis, cancer, crippled and deform
dren, the demented and insane.

The last General Assembly also appro
about $1,000,000 to the State Department


SOUTH WOOD STREET
B
A
WEST POLK STREET
C
D
S
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G
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K
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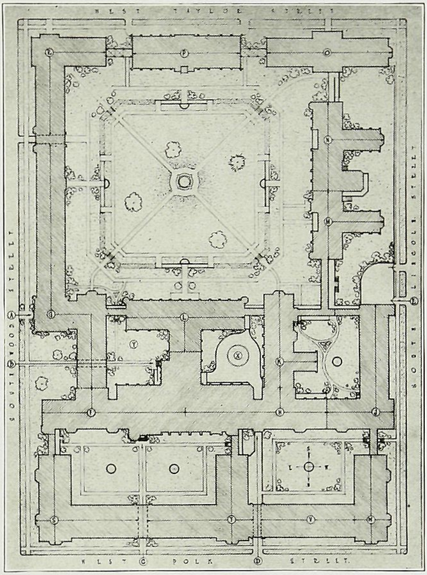
O

new Charitable Eye and Ear Infirmary,
atric Institute, and an Institute for Crip-
dren. It was imperative that in addition
special hospitals, which would provide
tudy of the diseases of the eye, ear, nose
at, the study of the causes of insanity,
urgical treatment of deformed and crip-
dren, there should be some provision for
and treatment of the many other dis-
ch as those of
d, lymphatics,
less glands, to-
with the dis-
of the heart,
omach and in-
the kidney, and
There should
provision for
o need general
aid. There
be also some
the treatment
n who are af-
ith the many
peculiar to the
nother great
he Department
Welfare was
ipped labora-
d extensive li-
It experienced
fficulty in ob-
igh class med-
, owing to the
hese facilities.
thus obvious
Department of
Velfare needed
aries, labora-
d men which
ersity possess-
ell as the clin-
ling which the
y was about
The Univer-
he other hand, needed the special hospi-
h the Department of Public Welfare was
erect; moreover, the Department of Pub-
re could provide a site for the clinical
which was much superior to that owned
niversity. The function of the Univer-
eeminently education and investigation.
rtment of Public Welfare, on the other
s especially well qualified to undertake
ruction and maintenance of buildings. It

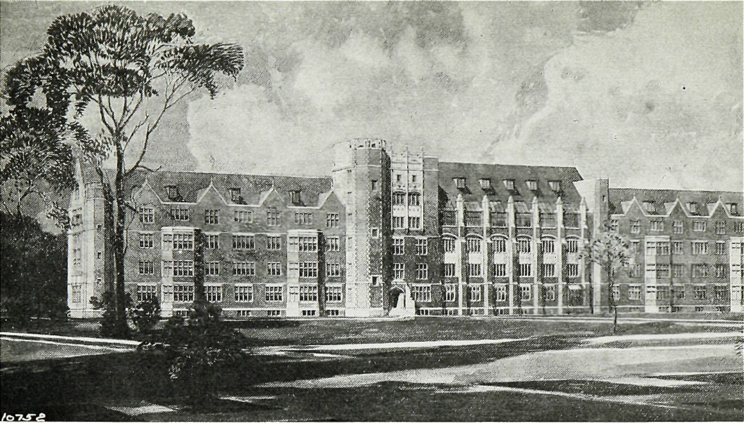
duties, and would furnish funds for upkeep w
the University could scarcely hope to obtain

These two great state medical agencies, w
had hitherto worked independently, and in r
respects duplicated each other's work, rea
that it would be highly advantageous for t
to consolidate and differentiate. This conso
tion not only would effect a great saving for
institution, and consequently for the taxpaye
the state, but also w
assure the public
the best medical
surgical skill woul
available for the ca
the sick poor of
state. The work of
group will not inter
in any way with tha
the practicing ph
cian. Its purpose
supplement, not to
plicate, the work
the practitioner.

On the fifth day
July, 1919, the S
Department of P
Welfare and the S
University agreed
plan of cooperation
differentiation, with
following objects
view: to construct
maintain a great g
of hospitals and i
tutes in the me
center of Chica
where laboratories
braries, and me
skill can be readily
tained; to provide
ical treatment for
indigent sick of
state; to give y
men and women
ical education,
training, such that they will become active
diers in the warfare for the prevention as we
the cure of disease; to help practicing physic
of the state to keep in touch with the latest
best methods of preventing and curing hu
ailments; to tell the people of the state ho
keep themselves physically efficient. The gre
object is to find and check at their sources
streams of human wreckage which are over
ing the hospitals, asylums, and prisons of the s



Block plan of the Research and Educational Hospitals of the State of Illinois.
Buildings now under construction: F—Clinical Institute, H—Eye and Ear Infirmary, K—Psychiatric Institute, M—Orthopedic Institute.
Future developments: A—Administration Entrance. B—Out-Patients' Entrance, C—Students' and Nurses' Entrance, D—Ambulance Entrance, E—Kitchen Entrance, G—Extension of Clinical Institute, J—Extension of Eye and Ear Infirmary, L—Administration Building, N—Extension of Orthopedic Institute, O—Infectious Diseases, P—Power Plant, R—Venereal Diseases, S—Research Institute, T—Library, Class Rooms and Research Laboratories, V—Class Rooms and Laboratories, W—Dental Institute.



The Main Building as viewed from the northeast.

PART TWO

FROM THE STANDPOINT OF THE DEPARTMENT OF PUBLIC WE

By CHARLES H. THORNE, Director of the Department of Public Welfare, State of

UPON entering the state service as director of public welfare in 1917, without knowledge of the subject, I found that the thing which most impressed me was the fact that the state was engaged in giving custodial care and incidental treatment to terminal cases, and was not doing anything worth while along the line of research, and had no ideas apparent upon the subject of preventive treatment.

It seems obvious enough that any activity, whether state or private, which spends one-fifth of its revenue upon a single thing, should know something about that thing, and should spend a considerable sum for the purpose of ascertaining causes, with the idea of reducing the cost. Why hasn't the state conducted research for humans the same as it has for hogs? This has been a current question in Springfield for some time, and I think the answer is that research on hogs has been conducted by the University, whereas research on humans has been attempted by an administrative department which is not fitted to do so.

No definite ideas regarding preventive treatment occurred to us until we had reached the conclusion that research must first be undertaken by some competent agency; then it at once became apparent that research was not the function of an administrative organization.

The necessity for rebuilding the able Illinois Charitable Eye and I caused department officials to stud of relocation, and it was promptly proper location would be one adja medical institutions, for the reason ticular type of medical service can s and that all types of medical serv locked and need to cooperate.

At the same time, the departmen charged with the duty of locating stitute for Children, and as the d ready knew that it needed adequate the study of insanity, mental defe problems of behavior, it at once b that the best results could be achiev all of these institutions in a group, all needed contact with skilled me volved research and rehabilitation, required dispensary service. Ina administrative and dispensary ser consolidated, the economy of hand group form was apparent.

In studying the organization for did not take long to discover tha ment's greatest difficulty in perform service would be its inability to fu personnel of the type needed.

As the University College of Med

nd found that they would need exactly
s which the department would have to
nely, hospitals.

aving what the other wanted and each
omplement of the other, an effort was
ssist each other by some form of joint
nd, in July, 1919, there was concluded a
eement between the University and the
nt of Public Welfare, whereby the Uni-
ould furnish the professional service, and
tment would undertake the administra-
ions of the group.

ne strength of this agreement, the Legis-
omptly appropriated the money neces-
urchase the old West Side Ball Park, to
three buildings needed by the depart-
l a clinical hospital required by the Uni-

gislators were quick to see the advan-
the group scheme and of the joint plan
on, and gave it their approval by appro-
and with the understanding that it was
ng the state to a project involving sev-
ons of dollars additional.

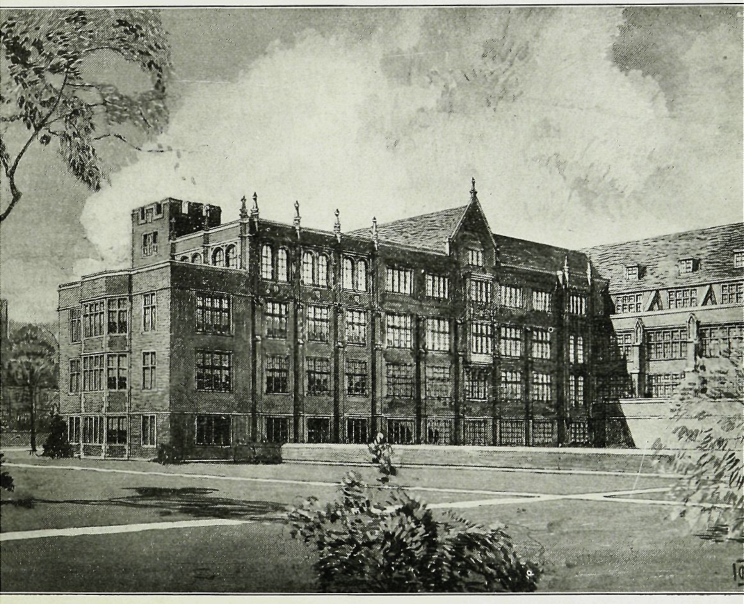
rious state institutions and services un-

enough well trained specialists, and have
obliged to attempt to do the training at the
ferent institutions.

Fair results have been attained even good
sults, when the individual was deeply intere
but the total result has not been able to meet
demands, and for the self-evident and repe
reason that an administrative department is
fitted to undertake university functions.

It is my hope that this group will eventu
be developed to include large, adequate, an
nearly perfect laboratories as can be devised,
university medical library, a contagious dis
hospital, an orthopedic hospital for adults, a
dren's hospital, a woman's hospital, and such o
units as may be required for the complete s
of the human body and its functions, for
teaching of medicine and surgery and for
training of nurses, attendants, social workers
cupational therapists, dietitians and other
cialists needed in the state charitable, penal
correctional services, and by other public and
vate ventures.

Good work cannot be accomplished wit
trained people. Trained people cannot be had



The Psychiatric Wing as viewed from the Quadrangle.

e so long as they are dealing with the interme-iate and terminal stages of disease of which the auses are unknown, and to ascertain causes re-uires research.

The yield of research, while not positive, has een so steady that the state is well warranted in pending large sums upon it, and to regard the noney spent as insurance against the future.

Every state and every government should be ndeavoring to discover the causes and preventive reatment of feeblemindedness and insanity, par-

all time.

The style of architecture selected f of buildings is Elizabethan, which ca the university spirit rather than spirit. The arrangement will provid parked courtyards affording abundan sides of all buildings, and opportunit tion and segregation.

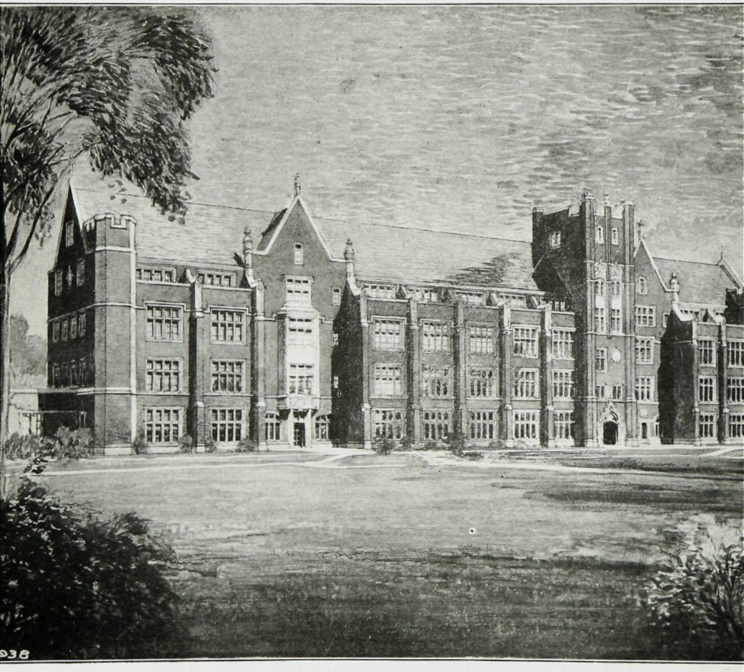
The whole project is based upon that with cooperation almost anythin and without it, nothing.

PART THREE

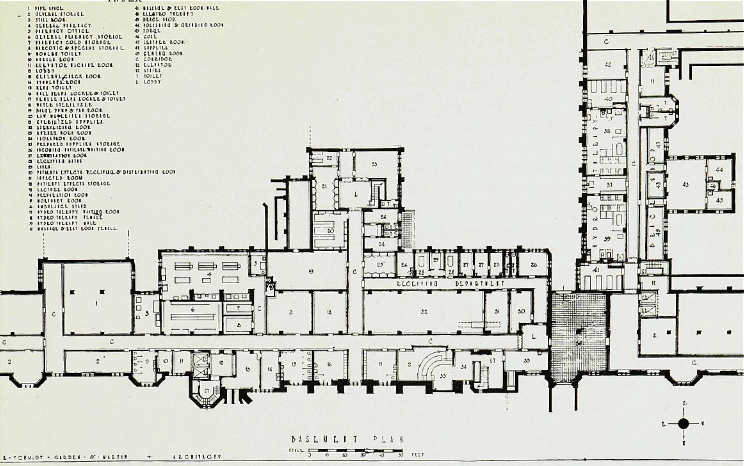
FROM THE STANDPOINT OF THE ARCHITECTS

EDGAR MARTIN, Supervising Architect; RICHARD E. SCHMIDT, GARDEN, & MA
Associate Architects, Chicago, Ill.

THE American visitor to Oxford and Cambridge has often commented upon the atmoshere of peace and quiet which pervades the quadangles of the old English college. If he be of a receptive mind, he will doubtless ha sire to play truant from the exacting his Cook's tour and to linger on fo one of these cloistered courts with its



Orthopedic Hospital as seen from the Quadrangle.



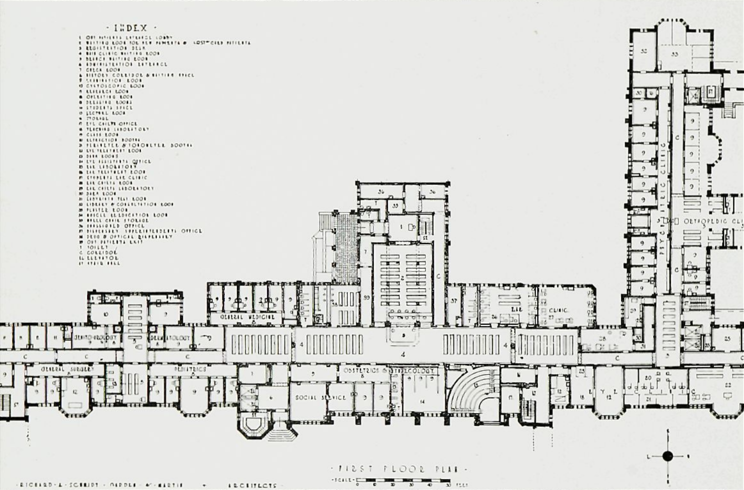
Plan of the basement of the main building.

d smooth expanse of greensward. It h a desire to secure something of this ere of sheltered seclusion as an environ- r sick and convalescent patients that a ptation of English collegiate gothic was or the buildings of the new Research and nal Hospitals now being constructed in for the State of Illinois. Located in a t congested and none too attractive dis- he city—a situation having very positive ges as an assured source of clinical ma- he hospital has exercised the privilege of ts back, as it were, upon its surroundings ing its own beauty within its domain. ho have directed this project believe that e made no mistake in emphasizing the of attractive surroundings; there is a conviction that our American hospitals some extent overlooked the therapeutic beauty and have at times become for- n seeking to satisfy the demands of sani- d cleanliness.

ce at the block plan will show that the buildings of the hospital are grouped he perimeter of the site, enclosing a num- nedium sized courts and a large central gle. In general, the rooms for the use ts are on the sides toward the courts and gle, while the less quiet and attractive toward the streets is devoted to hospital ward examination rooms and laborato- e courts and quadrangles will eventually receive such planting and landscape treatme will make them a pleasant recreation spac convalescent patients and an attractive ou from the wards.

The site, 556 feet by 800 feet, comprises ten acres. The portion of the main building under construction is set back from Polk S about 200 feet; this is to reserve space at the end of the site for future buildings, marked "T," and "V," which will be devoted to labo ries, libraries, and class rooms, with the mum possible north light. At "W" will b cated a future Dental Institute. In the main b ing the east portion will be devoted to the Cl Institute of the College of Medicine, with w for general medicine, general surgery, obste gynecology, and pediatrics. Future expansi the Clinical Institute will be into the por marked "G." The west portion of the main b ing, at "H," will shelter the Illinois Chari Eye and Ear Infirmary, now inadequately h on West Adams Street. Its future growth is vided for in the portion marked "J." The chiatric Institute for the treatment and stu mental diseases will occupy the wing marked The initial portion of the Orthopedic Inst where the particular requirements necessit building of the ward pavilion type, is locat "M," with an opportunity for future grow the south. At "L," the strategic center o group, will be the future central administr building, which, together with the portion as to maintain an open southern exposure for e wards of the main buildings; its roof will form promenade at the level of the second floor wards. The buildings in general will be three stories height, with a basement pipe space, and a urth story occupying the lower portion of the ace enclosed by the pitch roof; an interesting ructural device by which the roof load is carried inclined struts resembling flying buttresses, th a curtain wall set back about eight feet from e building line, permits the development of this urth floor or roof story as space with light and r equal to those of the floors below.

the plat plan, where the future develo vides for the erection of a commemora In the adjoining court, sufficiently avoid the confusion of contact with th number of dispensary patients, is th leading to the dispensary entrance, at At "C," entered from Polk Street, is t for students and nurses. From the "D," an easy incline to the basement l ambulances to drive directly under t and to unload their patients in a shelte passage. The ambulance court beyo "X," being also at this lower level, m

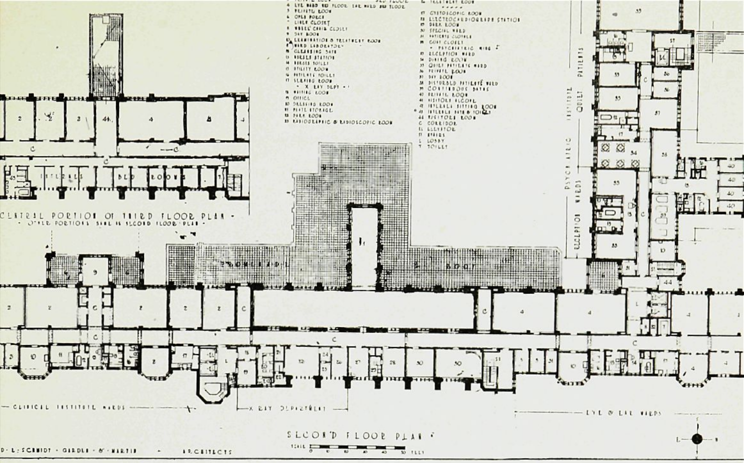


Plan of the first floor of the main building.

Communication over the entire area is assured a system of corridors slightly below the level the basement pipe space. In general, these rridors will be against the outside walls, rough which ample light and air is obtained; e first floor being five feet above the outside ade makes it possible to secure corridor winws above grade, without areas. The connecon between adjoining buildings becomes a doue corridor with a separate passage through hich pipes may be carried from one basement pe space to another. All interdepartmental mmunication, passage of visitors, transmission food, laundry, and supplies will be through e communicating corridor system, thus insurg ward privacy and a minimum of interference.

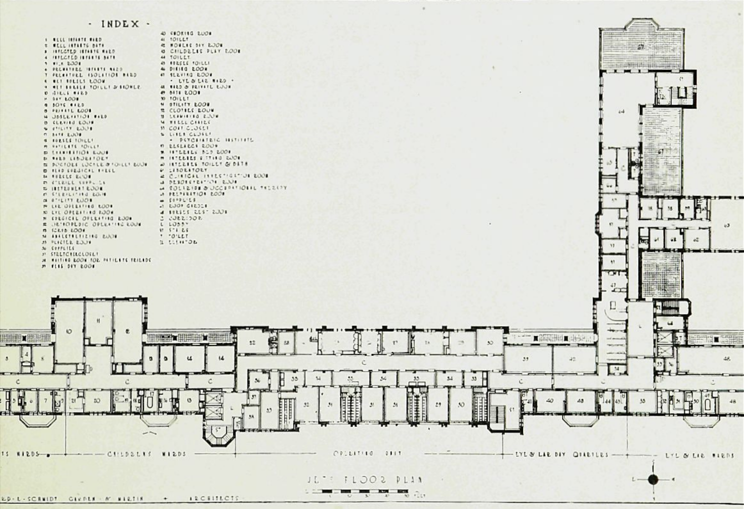
sible to secure well lighted ground around its four sides, of which those tial portion are shown in the basement

The out-patient department will most cases as the receiving departm hospital. From the great mass of hu material passing through it, will be selective cases to be transferred to th future study and treatment. There small receiving department at the am trance (see basement plan) but its largely restricted to ambulance cases state patients arriving by train at h the dispensary is closed. This import dispensary as the source of supply material has led to special emphasis b

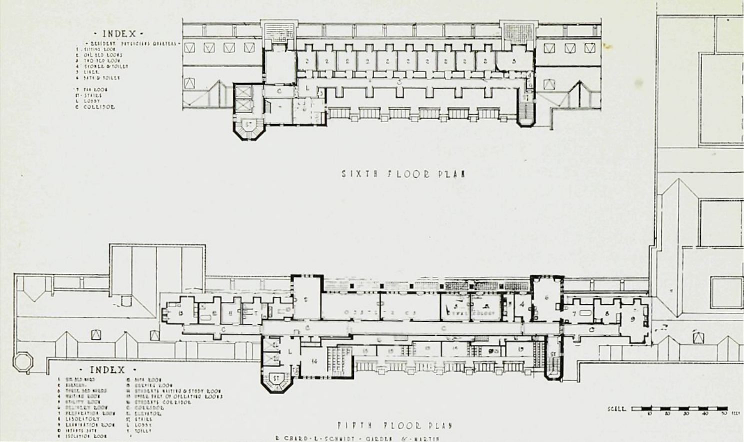


Plan of the second and central portion of third floor of the main building.

quarters. It will occupy the entire first he initial portion of the main building, sibility of expansion into adjoining portions be built later. The general clinics will he east half of the building, the eye and s the west half, and the psychiatric and orthopedic clinics the east and west halves o psychiatric wing. The general waiting roo so arranged as to keep the streams of arriving departing patients separated and to effect a distribution of arriving patients to the p desks and ultimately to the various clinics.



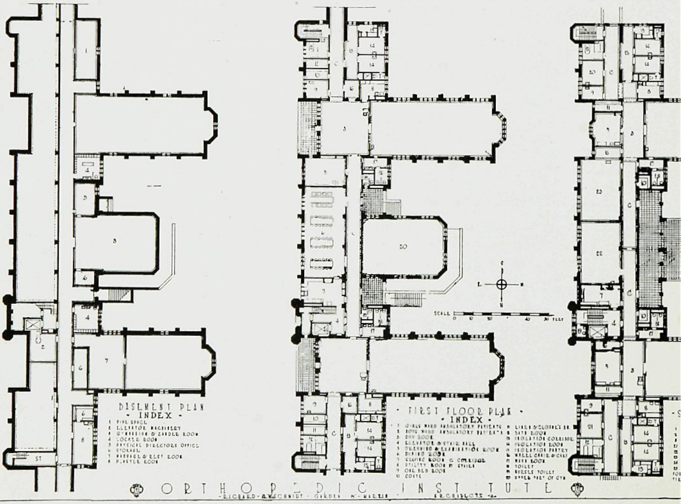
Plan of the fourth floor of the main building.



Plan of the fifth and sixth floor of the main building.

vators furnish convenient access to the x-ray department on the second floor and to the hydrotherapy and electrotherapy departments on the basement level. A small lecture room seating about one hundred will be available for lectures and demonstration talks to out-patie for use by students and nurses.

The second and third floors form ward floors. The wards are kept sm the clinician's desire for a unit bes



Plan of the basement, firrst, and second floors of the Orthopedic Institute.

20 square feet led to the choice of a bay 16 e and 20 feet deep as the typical unit for e scheme. In the eye and ear portions mewhat larger wards are desired, a ward wide with an area for eight beds is the the psychiatric wing, the distribution of nto reception, quiet, and disturbed wards rmined the plan layout, as is apparent pection; the second floor is assigned to ients and the third floor, with an iden- ngement, to female patients. Elevators ccess to the hydrotherapy department on ment level, and to a large solarium for n and occupational therapy, together le roof recreation space, at the level of n floor.

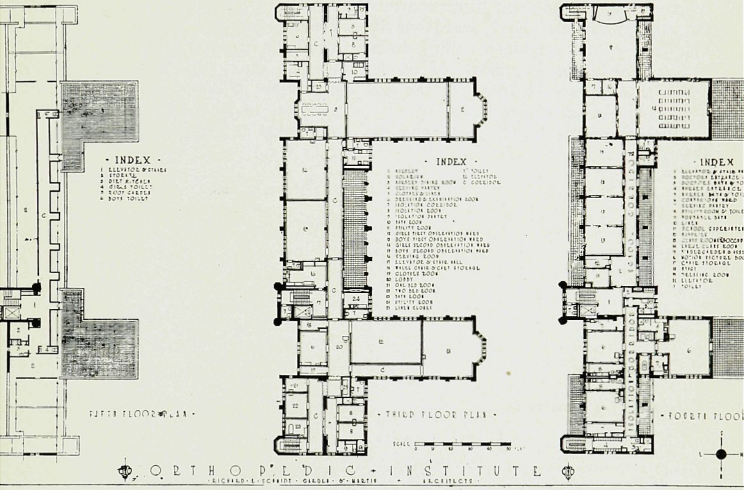
erating department, of a size adequate ntire ultimate development of the group, the central portion of the fourth floor. ses six operating rooms with side and combined, two smaller operating rooms light only, and the requisite utilities. amphitheaters seating from sixteen to lents each are provided for the six main ccess to these is by stairs descending rridor on the floor above, thus aiding g the operating corridor free from un- traffic.

eastern portion of the fourth floor are patients, a large proportion of whom are am tory, and a small ward unit. In the psych portion of this floor are research and de stration rooms and two interns' rooms fo psychiatric staff.

On the fifth floor is a ward unit for obst and gynecology, and on the sixth or top floo quarters for resident physicians. Interns fo present will be housed in temporary quarte the third floor of the main building, in space will ultimately be devoted to libraries and la tories.

The future laboratories, libraries, and rooms in the portions to be built upon the Street frontage will have direct access at floor to the hospital portions so that the idea of the institution, the close association o patient with the research physician and inv gative worker, may be most closely realized.

In the Orthopedic Institute, the requiren for long duration care and treatment fo greatest possible number of patients made a pavilion type of plan advisable. The south w are for girls and the north wards for boys the first floor are wards for ambulatory pati day rooms, and dining rooms. It may be here that the grade of the central quadrang raised to a point almost level with the first so that wheeled chairs may pass out into the



Plan of the third, fourth and fifth floors of the Orthopedic Institute.

first and second observation wards, both for :ls and boys, and a nursery ward. The central d southern portions of the fourth floor contain ıdy and class rooms for manual training and ıer forms of occupational instruction, as well instruction in the ordinary grammar school bjects. Here also is a large kindergarten and ıy room, with a small stage where moving pic-res may be shown and theatrical performances ven by the children. All of these rooms open French windows on open balconies and roofs that the therapeutic possibilities of fresh air d sunshine may be most fully realized.

In the northern portion of this floor are lo-ted three isolation wards, where children who ve contracted contagious diseases may be tem-rarily isolated and at the same time continue eir orthopedic treatment. Each ward has its ʼn serving pantry and combined utility, toilet d bath room. Separate entrances for nurses d doctors, with adequate facilities for the pre-ntion of cross infection, are provided.

The construction of the buildings throughout

economy in maintenance charges. Tl are steel casements hung in steel fr ventilating transoms above; they are furnish in the average ward from 15 20 per cent glass area to floor area. are laid up in a wire cut Illinois bı presents sufficient variety in color and approximate the charming weathered e English brick work. Bases, string co ings and window trim are of Indiana The roof covering is a fireflashed i shingle tile with predominating tints and russet brown. Ornamentation ha troduced sparingly and with discrimi greater reliance for effect being placed portion of parts and dignity of mater

Both in outward appearance and i struction of "each minute and unseen p who have directed this undertaking ha ored to make the building a worth expression of the idea behind them—th the state of Illinois to use its vast re the moral and physical betterment of

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